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Himanshu Pandey

GRB ADVANCED PROBLEMS IN ORGANIC CHEMISTRY

For JEE (Main & Advanced)
& All Other Engineering Entrance Examinations

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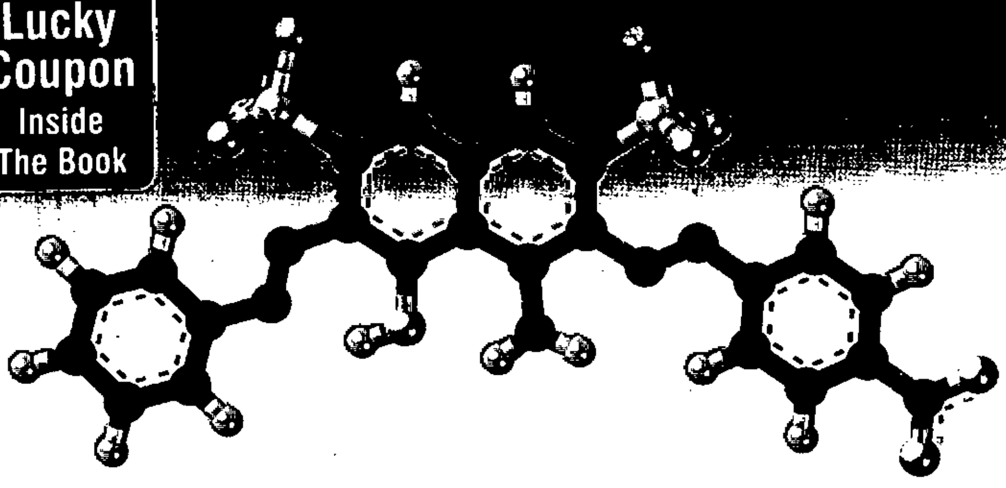

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PREFACE to the Sixth Edition

An excellent response to previous edition, I feel great pleasure in presenting fully revised edition of the book **"GRB Advanced Problems in Organic Chemistry for JEE"** according to latest pattern of examination.

This book deals with objective problems of each chapter which include Single Choice, Multiple Choice, Matching Type, Comprehension Type and Integer Type Problems. Exercise-1 in every chapter contains two levels, Level-1 is for JEE-Main and Level-2 is for JEE-Advanced. "This book is highly desirable that students, particularly those who work very much on their own, should have a mean of achieving confidence in organic chemistry".

The study of Organic Chemistry requires at least three processes : Learning, Understanding and Application. A very good way of achieving it, is through solving the problems.

I do hope that the new revised edition of the book will be more useful to the students and learned teachers. Suggestions for further improvement of the book will be gratefully acknowledged.

I wish to acknowledge my indebtedness to all the faculties across the India for their enthusiastic support and their useful suggestions given from time to time for improvement of this book.

I would like to thanks Mr. Manoj Kumar Bathla and Mr. Vishvnath Bathla, Directors of G. R. Bathla Publications Pvt. Ltd. for their effort in bringing out this edition.

February, 2014 **Himanshu Pandey**

Note : Students and honourable teachers may feel free to give valuable suggestions on the mail suggestionsgrb@gmail.com to improve the quality of book.

PREFACE *to the First Edition*

"New Pattern Advanced Problems in Organic Chemistry for IIT-JEE" has primarily been written with the aim of meeting the needs and interests of student seeking admission to professional courses especially in engineering and medical.

The present book on organic chemistry is designed especially in accordance with the new examination pattern and syllabus of IIT-JEE. The main objective of preparing this book is to keep pace with the changing trends of entrance examinations. To make the students more familiar with trends and tricks, how to solve problems, the present problems book has been prepared. The other salient features of the problems book are summarized below.

※ The problems are based on basic concepts, preparations, properties, structures and usefulness of organic chemistry.

※ Due considerations have been given to mechanism and stereochemical aspects of chemical reactions.

※ Maximum problems in this book are designed by combining two or more concepts. Answering them need thinking and deep knowledge.

I wish to acknowledge my indebtedness to Mr. Amresh Sharma, Mr. Amit Mishra and Mr. Vivek Pathak for their enthusiastic support.

I acknowledge the blessings and support of my mother Smt. Kalindee Pandey, father Dr. S.N. Pandey, uncle Shri Sudhakar Pandey, brother Sudhanshu, Saurabh and my wife Jaya.They supported me all the time during the preparation of book.

I would like to thank Shri Manoj Kumar Bathla and Shri Vishvnath Bathla, Directors, G. R. Bathla Publications Pvt. Ltd., for their effort in bringing out the book.

The author will be grateful to teachers and students, if they be kind enough to offer criticism and suggestions for its improvements and to point out the inevitable errors which, inspite of all efforts, creep in.

April, 2010 Himanshu Pandey

CONTENTS

1 General Organic Chemistry

EXERCISE-1 ONLY ONE CORRECT ANSWER

LEVEL-1

1. Which of the following belongs to $+I$ group ?
(a) —OH (b) —OCH_3 (c) —COOH (d) —CH_3

2. Which of the following is the strongest $-I$ group ?
(a) —$N^+(CH_3)_3$ (b) —$^+NH_3$ (c) —$^+S(CH_3)_2$ (d) —F

3. Among the following compounds, the strongest acid is :
(a) $HC\equiv CH$ (b) C_6H_6 (c) C_2H_6 (d) CH_3OH

4. Carbocations may be stabilised by :
(a) π - bonds only at allylic position
(b) π - bonds only at vinylic position
(c) π - bonds at allylic and benzylic position also
(d) $-I$ effect

5. In the anion $HCOO^-$, the two carbon-oxygen bonds are found to be of equal length. What is the reason for it ?
(a) The C$=$O bond is weaker than the C—O bond.
(b) The anion $HCOO^-$ has two resonating structures.
(c) The electronic orbitals of carbon atom are hybridized.
(d) The anion is obtained by removel of proton from the acid molecule.

6. Which of the following resonance structures is the major contributor to the resonance hybrid ?

$$\underset{\text{(I)}}{CH_3-CH_2-\overset{\oplus}{C}H-\ddot{\underset{\cdot\cdot}{O}}Me} \Leftrightarrow \underset{\text{(II)}}{CH_3-CH_2-CH=\overset{\oplus}{\underset{\cdot\cdot}{O}}Me}$$

(a) I (b) II
(c) Both have equal contribution (d) They are not resonance structures

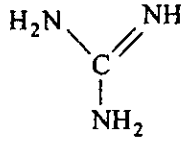
7. The species $CH_3\overset{+}{C}HCH_3$ is less stable than :
(a) $(CH_3)_3C^+$ (b) $CH_3CH_2\overset{+}{C}H_2$ (c) $CH_3\overset{+}{C}H_2$ (d) CH_3^+

8. Arrange in the order of decreasing pK_b.
(P) F—CH_2CH_2COOH
(Q) $Cl-\underset{\underset{Cl}{|}}{CH}-CH_2-COOH$
(R) $F-CH_2-COOH$
(S) $Br-CH_2-CH_2-COOH$

Correct answer is :
(a) $Q > S > P > R$ (b) $P > R > S > Q$ (c) $R > Q > P > S$ (d) $S > Q > P > R$

9. The strongest base is :

(a) $CH_3—N(CH_3)—CH_3$

(b) 

(c) $C_6H_5—N(C_6H_5)—C_6H_5$

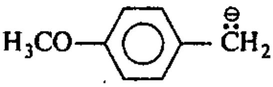
(d) $CH_3—NH—CH_3$

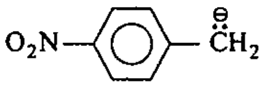
10. Consider the following species :

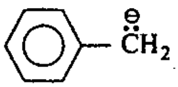
(A) $\overset{\ominus}{O}H$ (B) $CH_3—\overset{\ominus}{O}$ (C) $\overset{\ominus}{C}H_3$ (D) $\overset{\ominus}{N}H_2$

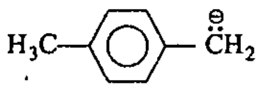
Arrange these species in their decreasing order of nucleophilicity.
(a) $C > D > B > A$ (b) $B > A > C > D$
(c) $A > B > C > D$ (d) $C > A > B > D$

11. Consider the following carbanions :

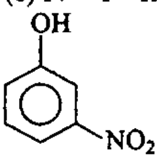
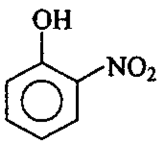
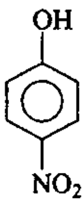
(I) 

(II) 

(III) 

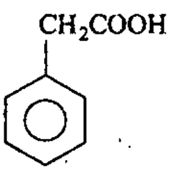
(IV) 

Correct decreasing order of stability is :
(a) II > III > IV > I (b) III > IV > I > II
(c) IV > I > II > III (d) I > II > III > IV

12.   

I II III

Arrange the following phenols in increasing order of pKa_1 value.
(a) I < II < III (b) III < I < II (c) III < II < I (d) I < III < II

13. 

(I)

$CH_2{=}CHCH_2—COOH$ (II)

CH_3CH_2COOH (III)

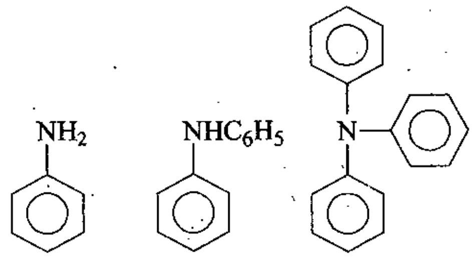
Arrange the following acids in decreasing order of $[H^+]$ conc.
(a) I > II > III (b) II > III > I (c) II > I > III (d) III > II > I

14. Arrange the following in decreasing order of the p*Ka* value.

$CH_2{=}CHCH_2NH_2, CH_3CH_2CH_2NH_2, CH{\equiv}CCH_2NH_2$

(a) I > II > III (b) II > I > III (c) III > II > I (d) II < III < I

15. Arrange the following in increasing order of p*Ka* value.



(I) (II) (III)

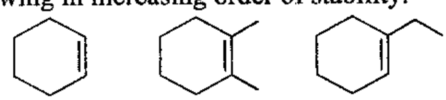
(a) I < II < III (b) III < I < II (c) III < II < I (d) II < III < I

16. Arrange the following in decreasing order of basicity.

Cl^-	$RCOO^-$	OH^-	RO^-	NH_2^-
I	II	III	IV	V

(a) I > II < III > IV < V (b) V > IV > II > III > I
(c) I > II > III > IV > V (d) V > IV > III > II > I

17. Arrange the following in increasing order of stability.

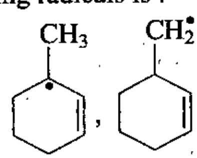


(I) (II) (III)

(a) I < II < III (b) II < I < III (c) I < III < II (d) II < III < I

18. Decreasing order of stability for the following radicals is :

$CH_2{=}\dot{C}H$ (I), $\dot{C}H_2CH{=}CH_2$ (II),



(III) (IV)

(a) II > III > I > IV (b) III > II > I > IV
(c) III < II < I < IV (d) I < IV < II < III

19. Increasing order of the following stability is :

$CH_3CH{=}CH_2$ (I) $CH_3CH_2CH{=}CH_2$ (II)

$(CH_3)_2CHCH{=}CH_2$ (III), $(CH_3)_3CCH{=}CH_2$ (IV)

(a) I > II > III > IV (b) I > III > II > IV
(c) I > IV > III > II (d) IV > III > II > I

20. Which of the following molecules can act as a nucleophile and an electrophile ?

(a) CH_3NH_2 (b) CH_3Cl (c) CH_3CN (d) CH_3OH

21. Which of the following molecules has the shortest carbon-carbon single bond length ?

(a) $CH_2=CH-C-CH$ (b) $CH_2=CH-C\equiv N$

(c) $CH_2=CH-CH=O$ (d) $CH_2=CH-CH=CH_2$

22. Give the correct order of decreasing basicity of the following compounds.

$C_6H_5NH_2$ (I) $(C_6H_5)_2NH$ (II) $(C_6H_5)_3N$ (III) $C_6H_{11}NH_2$ (IV)

(a) I > II > III > IV (b) IV > III > II > I

(c) IV > I > II > III (d) III > II > I > IV

23. The correct order of stability of the following carbocations is :

(a) $CH_3CH_2\overset{+}{C}H_2 > CH_2=CH-\overset{+}{C}H_2 > CH_2=CH\overset{+}{C}HCH_3 > CH_2=CH\overset{+}{C}(CH_3)_2$

(b) $CH_2=CH\overset{+}{C}H_2 > CH_3CH_2\overset{+}{C}H_2 > CH_2=CH\overset{+}{C}(CH_3)_2 > CH_2=CH\overset{+}{C}HCH_3$

(c) $CH_2=CH\overset{+}{C}(CH_3)_2 > CH_2=CH\overset{+}{C}HCH_3 > CH_2=CH\overset{+}{C}H_2 > CH_3CH_2\overset{+}{C}H_2$

(d) $CH_2=CH-\overset{+}{C}HCH_3 > CH_2=CH\overset{+}{C}(CH_3)_2 > CH_3CH_2-\overset{+}{C}H_2 > CH_2=CH\overset{+}{C}H_2$

24. The order of decreasing stability of the following cations is :

$CH_3\overset{+}{C}HCH_3$ (I), $CH_3\overset{+}{C}HOCH_3$ (II), $CH_3\overset{+}{C}HCOCH_3$ (III)

(a) III > II > I (b) I > II > III (c) II > I > III (d) I > III > II

25. What is the decreasing order of strength of the bases ?

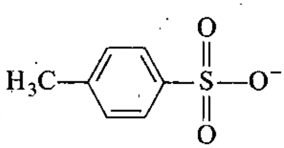
(I) OH^- (II) NH_2^- (III) $H-C\equiv C^-$ (IV) $CH_3CH_2^-$

(a) IV > II > III > I (b) III > IV > II > I

(c) I > II > III > IV (d) II > III > I > IV

26. The decreasing order of nucleophilicity among the nucleophiles is :

(I) $CH_3-\underset{\underset{O}{\|}}{C}-O^-$ (II) CH_3O^-

(III) CN^- (IV) 

(a) I > II > III > IV (b) IV > III > II > I

(c) II > III > I > IV (d) III > II > I > IV

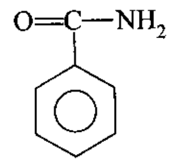
27. Different hydrogen in

$\overset{A}{CH_3}\overset{B}{CH}=\overset{C}{CH}-\overset{D}{CH_2}-\overset{E}{CH_2}-\overset{F}{CH}(CH_3)_2$

are represented by alphabets. Arrange them in decreasing order of reactivity towards radical substitution.

(a) C > A > E > D > F > B (b) F > B > A > C > D > E
(c) B > C > A > F > D > E (d) A > B > C > D > E > F

28. Consider the following :

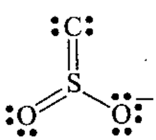
$CH_3CH_2NH_2$, $CH_3\overset{\overset{O}{\|}}{C}NH_2$, 

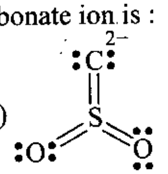
(I) (II) (III)

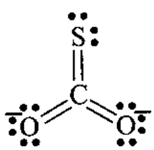
Correct order of their basic strength is :

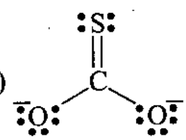
(a) I < II < III (b) II > I > III (c) III < II < I (d) II < III < I

29. The possible structure (s) of monothio-carbonate ion is :

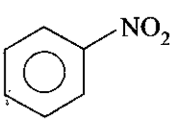
(a) 

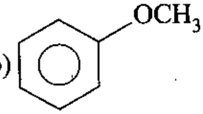
(b) 

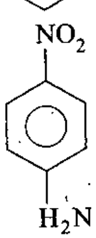
(c) 

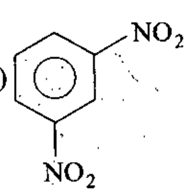
(d) 

30. In which of the following molecules, π - electron density in ring is minimum ?

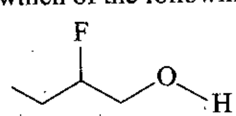
(a) 

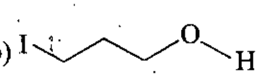
(b) 

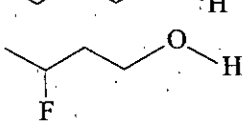
(c) 

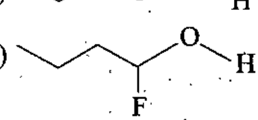
(d) 

31. In which of the following compounds the hydroxylic proton is most acidic ?

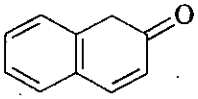
(a) 

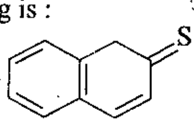
(b) 

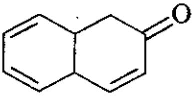
(c) 

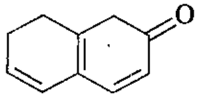
(d) 

32. The correct order of acidity of the following is :

(I) 

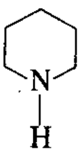
(II) 

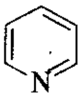
(III) 

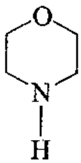
(IV) 

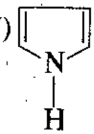
(a) III < IV < I < II
(b) III < IV < II < I
(c) IV < III < I < II
(d) None of these

33. In the following compounds,

(I) 

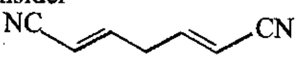
(II) 

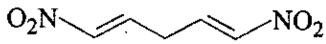
(III) 

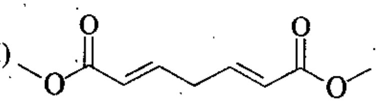
(IV) 

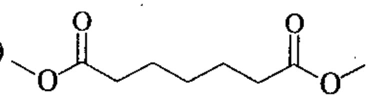
the order of basicity is :
(a) IV > I > III > II
(b) III > I > IV > II
(c) II > I > III > IV
(d) I > III > II > IV

34. Consider

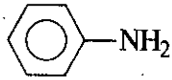
(I) 

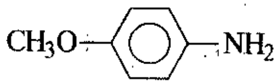
(II) 

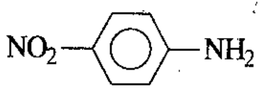
(III) 

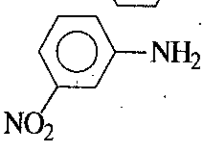
(IV) 

The correct order of their acidity is :
(a) II > I > III > IV
(b) II > III > I > IV
(c) IV > III > II > I
(d) none of these

35. (I) 

(II) 

(III) 

(IV) 

The correct order of decreasing basicity of the above compounds is :
(a) I > II > III > IV
(b) II > I > IV > III
(c) III > IV > II > I
(d) II > I > III > IV

36. Select the correct order of basicity.
(a) $CH_3CH_2^- > CH_2{=}CH^- > HC{\equiv}C^- > OH^-$
(b) $CH_3CH_2^- > HC{\equiv}C^- > CH_2{=}CH^- > OH^-$
(c) $CH_3CH_2^- > OH^- > HC{\equiv}C^- > CH_2{=}CH^-$
(d) $OH^- > HC{\equiv}C^- > CH_2{=}CH^- > CH_3CH_2^-$

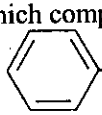
37. The acidity of the protons H^+ in the following is :

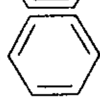
(I) $CH_3CH_2\overset{\overset{\displaystyle O}{\|}}{C}C\underline{H}_3$ (II) $CH_3CH_2O\overset{\overset{\displaystyle O}{\|}}{C}C\underline{H}_3$

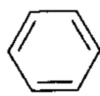
(III) $CH_3CH_2O\overset{\overset{\displaystyle O}{\|}}{C}C\underline{H}_2\overset{\overset{\displaystyle O}{\|}}{C}OCH_2CH_3$

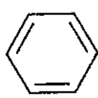
(a) I > II > III (b) I > III > II (c) II > I > III (d) III > I > II

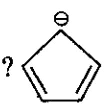
38. Which comparison is not correct as indicated ?

(a)  $—OH > CH_3OH$ (acidic nature)

(b)  $—NH_2 > CH_3NH_2$ (basic nature)

(c)  $—\overset{\oplus}{C}H_2 > CH_3\overset{\oplus}{C}H_2$ (stability)

(d)  $—\overset{\overset{\displaystyle O}{\|}}{C}OH > CH_3\overset{\overset{\displaystyle O}{\|}}{C}OH$ (acidic nature)

39. How many π electrons are there in the following species ? 

(a) 2 (b) 4 (c) 6 (d) 8

40. Which of the following is not correct ?
(a) A sigma bond is weaker than π bond.
(b) A sigma bond is stronger than π bond.
(c) A double bond is stronger than a single bond.
(d) A double bond is shorter than a single bond.

41. The length of the carbon-carbon single bond of the compounds
(II) $CH_2{=}CH{—}C{\equiv}CH$ (II) $CH{\equiv}C{—}C{\equiv}CH$
(III) $CH_3{—}CH{=}CH_2$ (IV) $CH_2{=}CH{—}CH{=}CH_2$
is expected to decrease in the order :
(a) III > II > I > IV (b) I > III > II > IV
(c) III > IV > I > II (d) II > IV > I > III

42. Which of the following involves no displacement or shifting of electrons ?
(a) Zeeman effect (b) Inductive effect
(c) Resonance (d) Electromeric effect

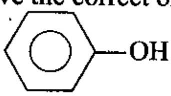
43. Which of the following exhibit electromeric effect ?
(a) Alkanes (b) Aldehydes
(c) Alkyl halides (d) Alkyl amines

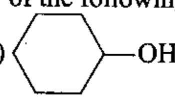
44. Point out the incorrect statement about resonance.
 (a) Resonance structure should have equal energy.
 (b) In resonance structures, the constituent atom should be in the same position.
 (c) In resonance structure there should be the same number of electron pairs.
 (d) Resonance structures should differ only in the location of electrons around the constituent atoms.

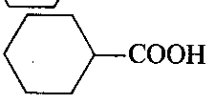
45. Resonating structures of molecules have
 (a) identical bonding
 (b) different bonding
 (c) identical arrangement of atoms and nearly same energies
 (d) the different number of paired and unpaired electrons

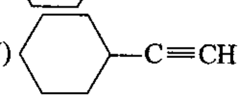
46. Shifting of electron of a multiple bond under the influence of a reagent is called :
 (a) *I*-effect (b) *M*-effect (c) *E*-effect (d) *T*-effect

47. Give the correct order of increasing acidity of the following compounds.

(I) 

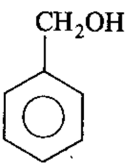
(II) 

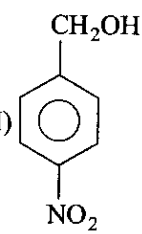
(III) 

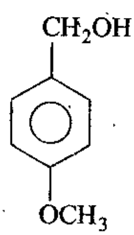
(IV) 

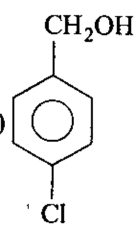
 (a) II < I < IV < III (b) IV < II < I < III
 (c) I < II < IV < III (d) IV < I < II < III

48. Consider the following benzyl alcohol :

(I) 

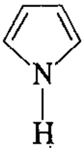
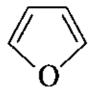
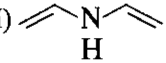
(II) 

(III) 

(IV) 

Correct order of their K_b value is :
 (a) III > IV > II > I (b) III > I > IV > II
 (c) I < II < III < IV (d) IV > II > I > III

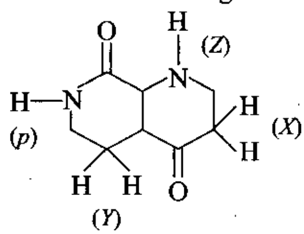
49. Resonance energy of these compounds will be in the order as :

(I)  (II)  (III) 

(a) III > I > II (b) I > II > III (c) II > III > I (d) II > I > III

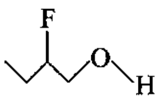
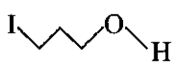
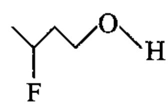
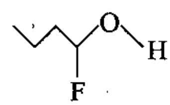
LEVEL-2

1. Which of the indicated H in the following is most acidic?



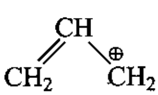
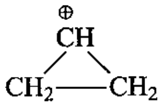
(a) X (b) Y (c) Z (d) p

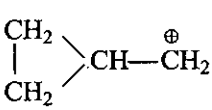
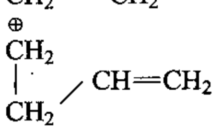
2. In which of the following compounds is hydroxylic proton the most acidic?

(a)  (b)  (c)  (d) 

3. Which of the following pairs does not represent the resonance contributors of the same species?

(a) $CH_2=CH-\overset{\ominus}{O}$ and $\overset{\ominus}{C}H_2-CH=O$

(b)  and 

(c)  and 

(d) $CH_3-\overset{\oplus}{N}(=O)-O^{\ominus}$ and $CH_3-\overset{\oplus}{N}(=O)=O$

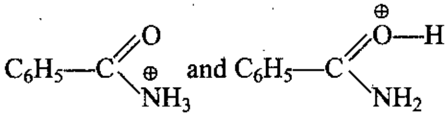
4. Which of the following is not a planar molecule?
(a) $H_2C=C=CH_2$ (b) $H_2C=C=C=CH_2$
(c) $H_2C=C=O$ (d) $NC-HC=CH-CN$

5. Which of the following pairs does not represent resonance structures?

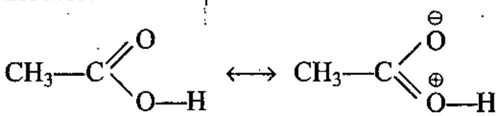
(a) $CH_3-C\equiv\overset{\oplus}{N}-\overset{\ominus}{O}$ and $CH_3-\overset{\oplus}{C}=N-\overset{\ominus}{O}$

(b) $CH_2=\overset{\oplus}{N}(O^{\ominus})(O^{\ominus})$ and $\overset{\ominus}{C}H_2-\overset{\oplus}{N}(=O)-O^{\ominus}$

(c) $CH_2=\overset{\oplus}{N}=\overset{\ominus}{N}$ and $\overset{\ominus}{C}H_2—\overset{\oplus}{N}\equiv N$

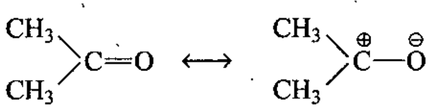
(d) 

6. In which of the following pairs is the structure on the right major resonance contributor?

(a) 

(b) $CH_2=CH—\ddot{\underset{\cdot\cdot}{Cl}}: \longleftrightarrow \overset{\ominus}{C}H_2—CH=\overset{\oplus}{\underset{\cdot\cdot}{Cl}}:$

(c) 

(e) 

7. In which of the following pairs of resonance contributors is the structure on the right a important contributor?

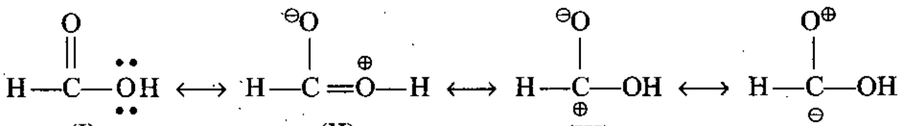
(a) $H—\overset{\oplus}{C}=\ddot{O}: \longleftrightarrow H—C\equiv\overset{\oplus}{O}:$

(b) $\overset{\ominus}{C}H_2—\overset{\oplus}{N}\equiv\ddot{N} \longleftrightarrow CH_2=\overset{\oplus}{N}=\overset{\ominus}{N}$

(c) $CH_3—\overset{\oplus}{C}H—\ddot{\underset{\cdot\cdot}{O}}H \longleftrightarrow CH_3—CH=\overset{\oplus}{\underset{\cdot\cdot}{O}}H$

(d) All of the above

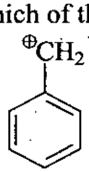
8. Examine the following resonating structures of formic acid and arrange them in decreasing order of stability :



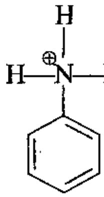
(I) (II) (III) (IV)

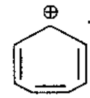
(a) II > I > III > IV
(b) I > II > III > IV
(c) III > II > IV > I
(d) IV > III > I > II

9. Which of the following compounds will not show resonance?

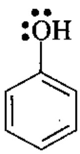
(a) 

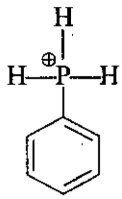
(b) $CH_2=CH—CH=CH—\overset{\oplus}{C}H_2$

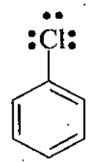
(c) 

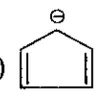
(d) 

10. Which of the following compounds will exhibit *d*-orbital resonance?

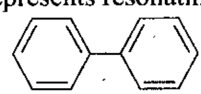
(a) 

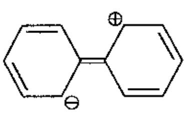
(b) 

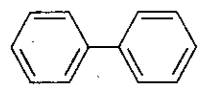
(c) 

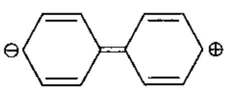
(d) 

11. Which of the following represents resonating structure of ?



(a) 

(b) 

(c) 

(d) All of these

12. Which of the following is not a permissible resonating form?

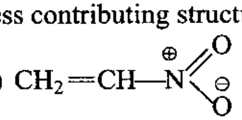
(a) $\overset{\oplus}{C}H_2-\underset{\underset{CH_3}{|}}{N}-\overset{\ominus}{O}$

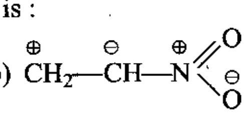
(b) $CH_2=\underset{\underset{CH_3}{|}}{\overset{\oplus}{N}}-\overset{\ominus}{O}$

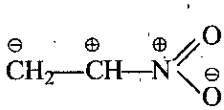
(c) $CH_2=\underset{\underset{CH_3}{|}}{\overset{\oplus}{N}}=O$

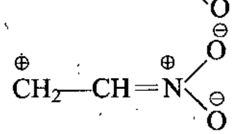
(d) $\overset{\ominus}{C}H_2-\underset{\underset{CH_3}{|}}{N}=O$

13. Less contributing structure of nitroethene is :

(a) 

(b) 

(c) 

(d) 

14. Which will be the least stable resonating structure?

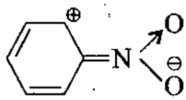
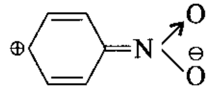
(a) $CH_2=CH-\overset{\oplus}{C}H-\overset{\ominus}{C}H-\ddot{N}H_2$

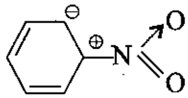
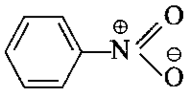
(b) $\overset{\ominus}{C}H_2-\overset{\oplus}{C}H-CH=CH-\ddot{N}H_2$

(c) $\overset{\ominus}{C}H_2-CH=CH-CH=\overset{\oplus}{N}H_2$

(d) $CH_2=CH-\overset{\ominus}{C}H-CH=\overset{\oplus}{N}H_2$

15. Which will be the least stable resonating structure?

(a)  (b) 

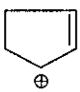
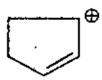
(c)  (d) 

16. Which of the following pairs of structures is not a pair of resonating structures?

(a) $H-C\equiv\overset{\oplus}{N}H$ and $H-\overset{\oplus}{C}=\ddot{N}-H$

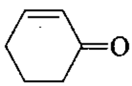
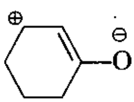
(b) $CH_3-CH=CH-CH_3$ and $CH_3CH_2CH=CH_2$

(c) $CH_3-\underset{O^{\ominus}}{\underset{|}{C}}=CH-\underset{O}{\underset{\|}{C}}-CH_3$ and $CH_3-\underset{O}{\underset{\|}{C}}-\overset{\ominus}{CH}-\underset{O}{\underset{\|}{C}}-CH_3$

(d)  and 

17. Which of the following pairs of structures does not represent resonating structures?

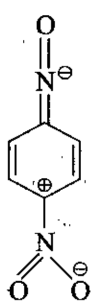
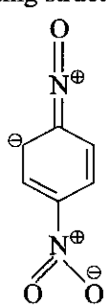
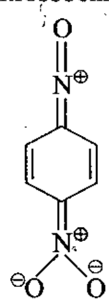
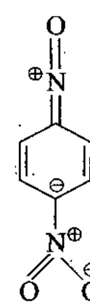
(a) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$ and $CH_3-\overset{OH}{\overset{|}{C}}=CH_2$

(b)  and 

(c) $CH_3-\overset{\oplus O-H}{\overset{\|}{C}}-CH_3$ and $CH_3-\overset{OH}{\overset{|}{\underset{\oplus}{C}}}-CH_3$

(d) $CH_2=C=O$ and $\overset{\ominus}{C}H_2-C\equiv\overset{\oplus}{O}$

18. The most stable resonating structure of *p*-nitrosobenzene is :

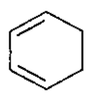
(a)  (b)  (c)  (d) 

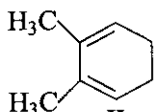
19. Which of the following molecules has longest C=C strength?

(a) $CH_2=C=CH_2$ (b) $CH_3-CH=CH_2$

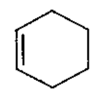
(c) $CH_3-C(CH_3)_2-CH=CH_2$ (d) $CH_3-C(CH_3)=CH_2$

20. The decreasing order of bond length of C=C in the following compounds is :


I

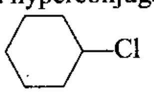
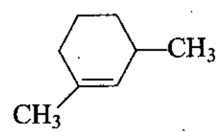
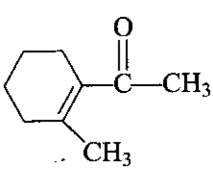

II


III

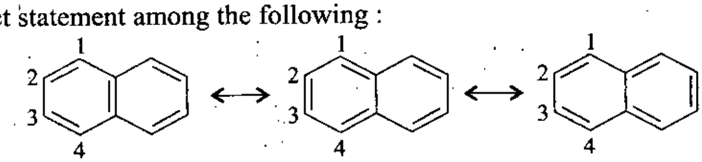

IV

(a) II > I > IV > III (b) III > II > I > IV
(c) IV > II > I > III (d) IV > I > II > III

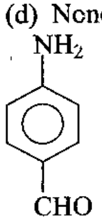
21. In which of the following molecules all the effects namely inductive, mesomeric and hyperconjugation operate?

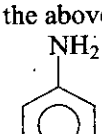
(a) 
(b) 
(c) 
(d) 

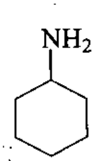
22. There are three canonical structures of naphthalene. Examine them and find correct statement among the following :



(a) All C—C bonds are of same length
(b) C_1-C_2 bond is shorter than C_2-C_3 bond
(c) C_1-C_2 bond is larger than C_2-C_3 bond
(d) None of the above

23. 
I


II

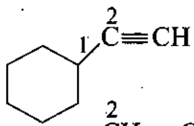
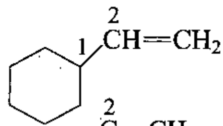

III

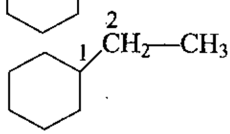
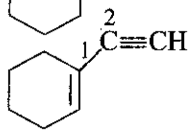
$CH_2=NH$
IV

Among these compounds the correct order of C—N bond length is :

(a) IV > I > II > III (b) III > I > II > IV
(c) III > II > I > IV (d) III > I > IV > II

24. $C_1—C_2$ bond is shortest in :

(a)  (b) 

(c)  (d) 

25. Among the following three canonical structures what would be their relative contribution in hybrid?

$CH_2=CH—CH=CH—CH=CH_2$ I

$CH_2=CH—\overset{\oplus}{C}H—CH=CH—\overset{\ominus}{C}H_2$ II

$\overset{\oplus}{C}H_2—CH=CH—CH=CH—\overset{\ominus}{C}H_2$ III

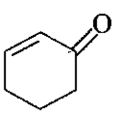
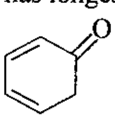
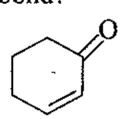
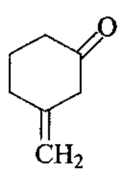
(a) I > II > III (b) III > II > I (c) I > III > II (d) III > I > II

26. $CH_3—{}^2\underset{{}_1CH_2—H}{\overset{H}{C}}—{}^3\overset{H}{C}H—{}^4CH_2—H;$

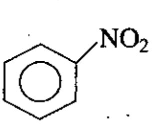
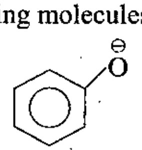
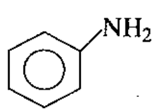
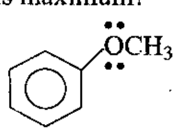
$C_1—H, C_2—H, C_3—H$ and $C_4—H$ the homolytic bond dissociation energy is in the order :

(a) $C_2—H > C_3—H > C_4—H > C_1—H$
(b) $C_1—H > C_4—H > C_2—H > C_3—H$
(c) $C_2—H > C_3—H > C_1—H > C_4—H$
(d) $C_1—H > C_4—H > C_3—H > C_2—H$

27. Which of the following has longest C—O bond?

(a)  (b)  (c)  (d) 

28. In which of the following molecules π-electron density in ring is maximum?

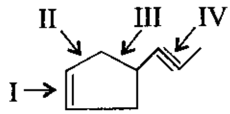
(a)  (b)  (c)  (d) 

29. The correct stability order of the following resonance structures is :

$H_2C=\overset{\oplus}{N}=\overset{\ominus}{N}$ (I) $H_2\overset{\oplus}{C}—N\equiv\overset{\ominus}{N}$ (II) $H_2\overset{\ominus}{C}—\overset{\oplus}{N}\equiv N$ (III) $H_2\overset{\ominus}{C}—N=\overset{\oplus}{N}$ (IV)

(a) I > II > IV > III
(b) I > III > II > IV
(c) II > I > III > IV
(d) III > I > IV > II

30. What is correct increasing order of bond lengths of bond indicated as I, II, III and IV in following compounds?



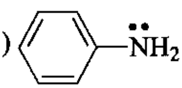
(a) I < II < III < IV
(b) II < III < IV < I
(c) IV < II < III < I
(d) IV < I < II < III

31. Acylium cation has two resonating structures (I) and (II),

$$\underset{\text{I}}{R-\overset{\oplus}{C}=\ddot{O}:} \leftrightarrow \underset{\text{II}}{R-C\equiv\overset{\oplus}{O}:}$$

Which statement is correct for (I) and (II)?
(a) (I) is more stable than (II)
(b) Stability of (II) is more than (I)
(c) Both have same stability
(d) None of these

32. Consider the following three amines,

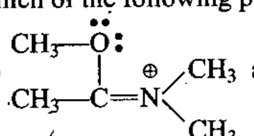
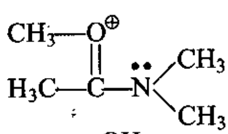
(1) $CH_3CH_2-\ddot{N}H_2$ (2) $CH_2=CH-\ddot{N}H_2$ (3) 

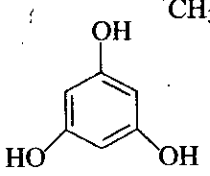
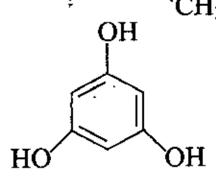
Arrange C—N bond length of these compounds in decreasing order :
(a) 1 > 2 > 3 (b) 1 > 3 > 2 (c) 3 > 2 > 1 (d) 2 > 3 > 1

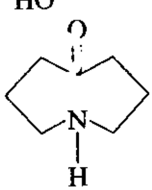
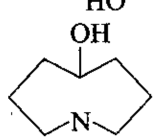
33. The C—Cl bond length is shortest in :

(a) $CH_2=CH-\ddot{\underset{..}{Cl}}:$
(b) CH_3-Cl
(c) $C_6H_5-CH_2-Cl$
(d) $CH_2=CH-CH_2-Cl$

34. Which of the following pairs of structure are resonance structure?

(1)  and 

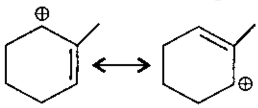
(2)  and 

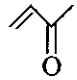
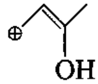
(3)  and 

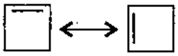
(4) $(C_6H_5)_2CH-\overset{\oplus}{N}\begin{smallmatrix}\nearrow O \\ \searrow \overset{\ominus}{O}\end{smallmatrix}$ and $(C_6H_5)_2C=\overset{\oplus}{N}\begin{smallmatrix}\nearrow OH \\ \searrow \overset{\ominus}{O}\end{smallmatrix}$

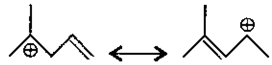
(a) 1 and 4 (b) 2 and 3 (c) 1 and 2 (d) All of these

35. Which of the following is pair of resonance structure?

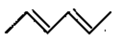
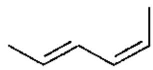
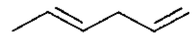
(a) 

(b)  and 

(c) 

(d) 

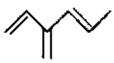
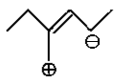
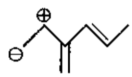
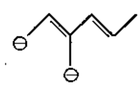
36. The most stable diene is :

(a)  (b)  (c)  (d) 

37. Which of the following cation would have greatest stability?

(a) $CH_3-\ddot{\underset{\cdot\cdot}{S}}-\overset{\oplus}{C}H_2$ (b) $(CH_3)_2\ddot{N}-\overset{\oplus}{C}H_2$ (c) $CH_3-\ddot{\underset{\cdot\cdot}{O}}-\overset{\oplus}{C}H_2$ (d) $:\ddot{\underset{\cdot\cdot}{F}}-\overset{\oplus}{C}H_2$

38. Which of the following is not valid resonance structure of polyene?

(a)  (b)  (c)  (d) 

39. Most contributing structure in nitroethene is :

(a) $CH_2=CH-\overset{\oplus}{N}(=O)-\overset{\ominus}{O}$

(b) $\overset{\oplus}{C}H_2-\overset{\ominus}{C}H-\overset{\oplus}{N}(=O)-\overset{\ominus}{O}$

(c) $\overset{\ominus}{C}H_2-\overset{\oplus}{C}H-\overset{\oplus}{N}(=O)-\overset{\ominus}{O}$

(d) $\overset{\oplus}{C}H_2-CH=\overset{\oplus}{N}(-\overset{\ominus}{O})-\overset{\ominus}{O}$

40. The most stable resonating structure of $CH_3-\ddot{\underset{\cdot\cdot}{O}}-CH=CH$ is :

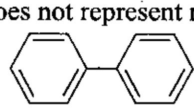
(a) $CH_3-\ddot{\underset{\cdot\cdot}{O}}-\overset{\ominus}{C}H-\overset{\oplus}{C}H_2$

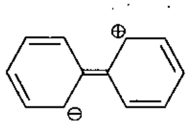
(b) $CH_3-\overset{\oplus}{O}=CH-\overset{\ominus}{C}H_2$

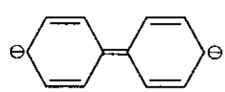
(c) $CH_3-\overset{\ominus}{\ddot{\underset{\cdot\cdot}{O}}}=CH-\overset{\oplus}{C}H_2$

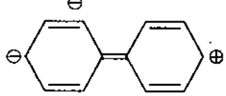
(d) $CH_3-O-\overset{\oplus}{C}H-\overset{\ominus}{C}H_2$

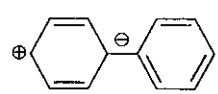
41. Which of the following does not represent resonating structure of ?



(a) 

(b) 

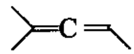
(c) 

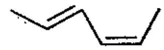
(d) 

42. The correct stability order of following species is :


(X)


(Y)

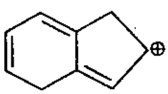
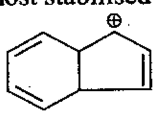
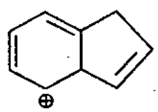
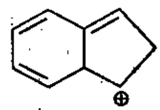

(Z)


(W)

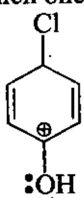
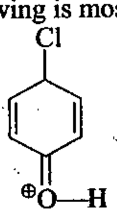
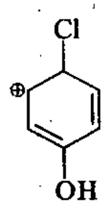
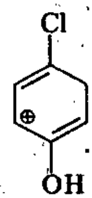
(a) $X > Y > W > Z$ (b) $Y > X > W > Z$ (c) $X > W > Z > Y$ (d) $Z > X > Y > W$

43. Choose the correct statement :
   (a) *I* effect operate in both σ and π bonds
   (b) *I* effect create net charge in molecule
   (c) *I* effect transfer electron from one carbon to another
   (d) *I* effect create partial charges and it is distance dependent

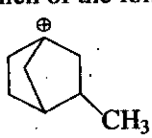
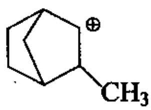
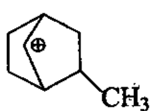
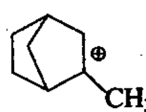
44. Which carbocation is most stabilised among following?

(a)  (b)  (c)  (d) 

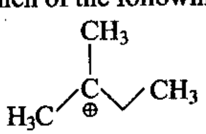
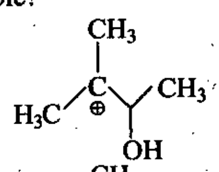
45. Which one of the following is most stable?

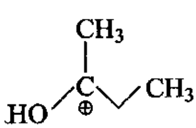
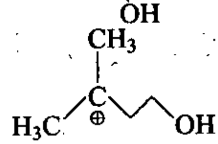
(a)  (b)  (c)  (d) 

46. Which of the following cations is most stable?

(a)  (b)  (c)  (d) 

47. Which of the following cations is most stable?

(a)  (b) 

(c)  (d) 

48. Which of the following carbanions is most stable?

(a) $CH_3-\overset{\ominus}{C}H_2$ (b) $CH_2=CH-\overset{\ominus}{C}H_2$

(c) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{C}H_2$ (d) $CH_3-\overset{\overset{NH}{\|}}{C}-\overset{\ominus}{C}H_2$

49. In which of the following 2nd anion is more stable than first?

(a) $O_2N-\overset{\ominus}{C}H_2$ and $F-\overset{\ominus}{C}H_2$ (b) $\overset{\ominus}{C}F_3$ and $\overset{\ominus}{C}Cl_3$

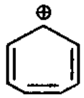
(c) $F_3C-\overset{\ominus}{C}H_2$ and $Cl_3C-\overset{\ominus}{C}H_2$ (d) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{C}H_2$ and $H_2N-\overset{\ominus}{C}H_2$

50. Arrange the following carbanions in decreasing order of stability :

$CH_2=\overset{\ominus}{C}H$ (P) $Ph-\overset{\ominus}{C}H_2$ (Q) $CH_2=CH-\overset{\ominus}{C}H_2$ (R)  (S)

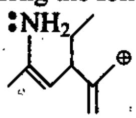
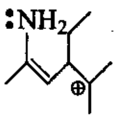
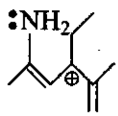
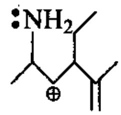
(a) $P>Q>R>S$ (b) $S>Q>P>R$
(c) $S>Q>R>P$ (d) $Q>S>R>P$

51. Arrange the following cations in decreasing order of stability :

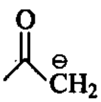
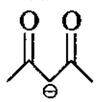
 (P) $CH_2=CH-\overset{\oplus}{C}H_2$ (Q) $Ph-\overset{\oplus}{C}H_2$ (R) $CH_3-\overset{\oplus}{C}H_2$ (S)

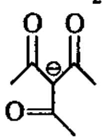
(a) $P>R>Q>S$ (b) $R>P>S>Q$ (c) $Q>R>P>S$ (d) $P>Q>S>R$

52. Among the following which is most stabilised cation ?

(a)  (b)  (c)  (d) 

53. Which of the following anions is most stabilised?

(a)  (b) 

(c)  (d) All have same stability

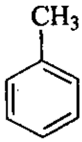
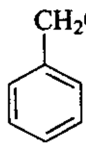
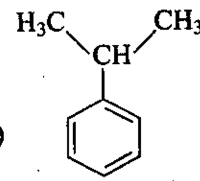
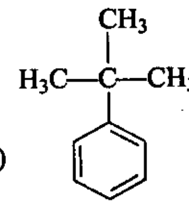
54. Arrange the following anions in decreasing order of stability :

$H-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{C}H-\overset{\overset{O}{\|}}{C}-H$ (P) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{C}H-\overset{\overset{O}{\|}}{C}-H$ (Q)

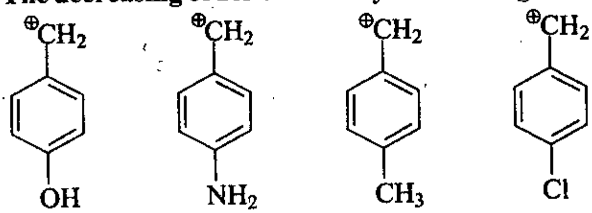
$CH_3-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{C}H-\overset{\overset{O}{\|}}{C}-\ddot{\underset{\cdot\cdot}{O}}-CH_3$ (R)

(a) $R>Q>P$ (b) $Q>R>P$
(c) $P>R>Q$ (d) $P>Q>R$

55. Which of the following is most stabilised by hyperconjugation?

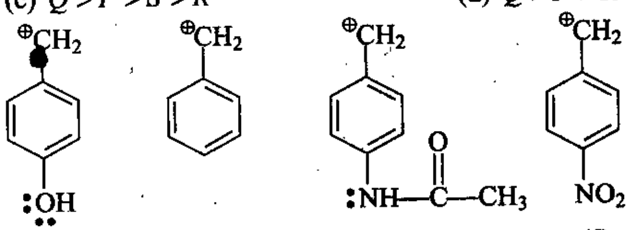
(a)  (b)  (c)  (d) 

⇒ **The decreasing order of stability of following cations is (Question No. 56-60).**

56.  :

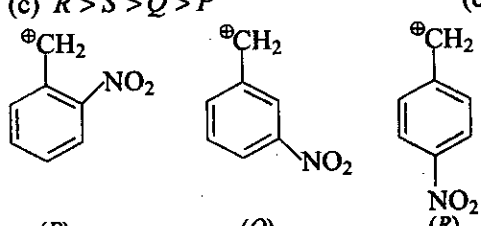
(*P*) (*Q*) (*R*) (*S*)

(a) $P > Q > R > S$
(b) $Q > S > R > P$
(c) $Q > P > S > R$
(d) $Q > P > R > S$

57.  :

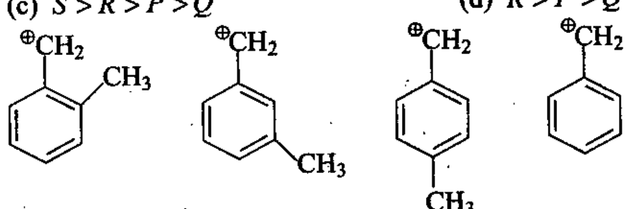
(*P*) (*Q*) (*R*) (*S*)

(a) $P > R > Q > S$
(b) $Q > R > S > P$
(c) $R > S > Q > P$
(d) $P > R > S > Q$

58.  :

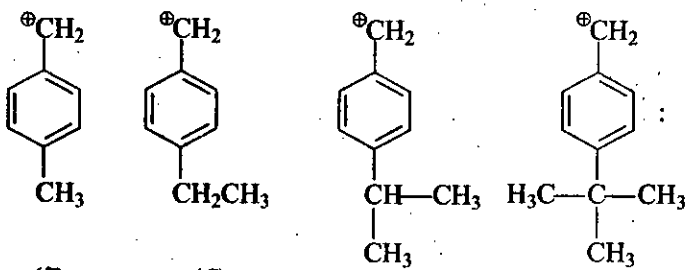
(*P*) (*Q*) (*R*) (*S*)

(a) $Q > R > P > S$
(b) $S > Q > R > P$
(c) $S > R > P > Q$
(d) $R > P > Q > S$

59.  :

(*P*) (*Q*) (*R*) (*S*)

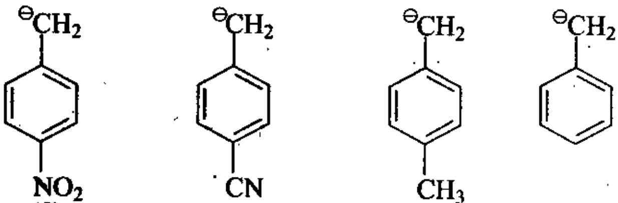
(a) $P > Q > R > S$ (b) $P > S > Q > R$ (c) $P > R > Q > S$ (d) $S > R > Q > P$

60.  :

(P) (Q) (R) (S)

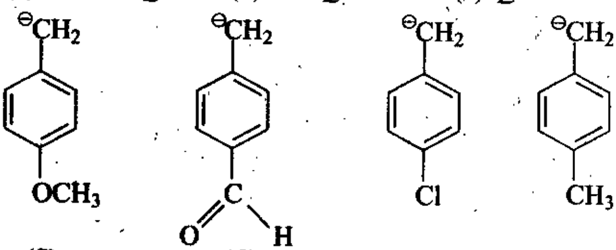
(a) $S > R > Q > P$ (b) $P > Q > R > S$ (c) $Q > R > S > P$ (d) $R > S > P > Q$

⇒ **The decreasing order of stability of following anions is (Question No. 61-65).**

61.  :

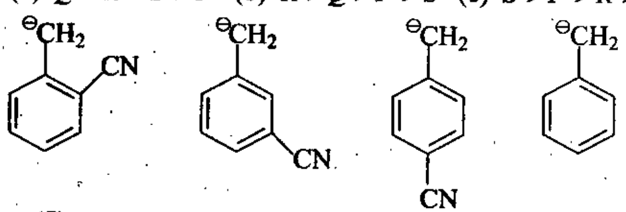
(P) (Q) (R) (S)

(a) $S > R > Q > P$ (b) $P > Q > R > S$ (c) $Q > P > R > S$ (d) $P > Q > S > R$

62.  :

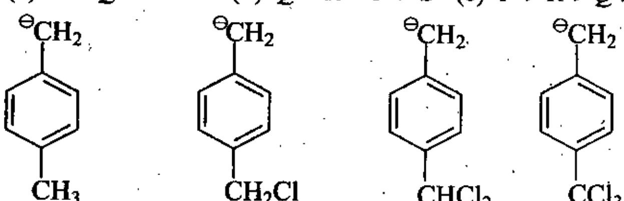
(P) (Q) (R) (S)

(a) $Q > R > S > P$ (b) $R > Q > P > S$ (c) $S > P > R > Q$ (d) $P > Q > R > S$

63.  :

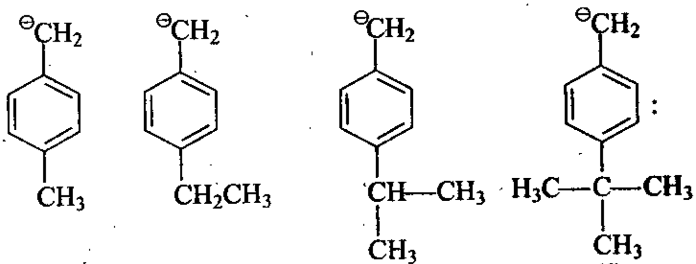
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > R > P > S$ (c) $P > R > Q > S$ (d) $S > R > Q > P$

64.  :

(P) (Q) (R) (S)

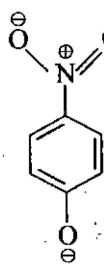
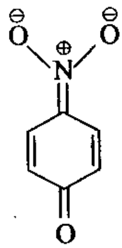
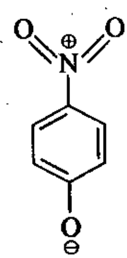
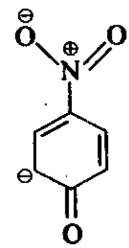
(a) $P > Q > R > S$ (b) $S > R > Q > P$ (c) $Q > S > R > P$ (d) $Q > R > S > P$

65.  :

(P) (Q) (R) (S)

(a) $R > S > Q > P$ (b) $P > S > R > Q$ (c) $Q > P > S > R$ (d) $S > R > Q > P$

66. The most unlikely representation of resonance structure of *p*-nitrophenoxide is :

(a) 
(b) 
(c) 
(d) 

67. Which will be least stable resonating structure?

(a) $CH_2{=}CH{-}\overset{\oplus}{C}H{-}\overset{\ominus}{C}H{-}O{-}CH_3$ (b) $\overset{\ominus}{C}H_2{-}\overset{\oplus}{C}H{-}CH{=}CH{-}OCH_3$

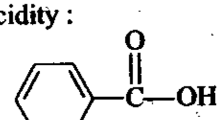
(c) $\overset{\ominus}{C}H_2{-}CH{=}CH{-}CH{=}\overset{\oplus}{O}{-}CH_3$ (d) $CH_2{=}CH{-}\overset{\ominus}{C}H{-}CH{=}\overset{\oplus}{O}{-}CH_3$

68. Which of the following acids has lowest value of dissociation constant?

(a) $CH_3{-}\underset{\displaystyle F}{\underset{|}{C}H}{-}COOH$ (b) $\underset{\displaystyle F}{\underset{|}{C}H_2}{-}CH_2{-}COOH$

(c) $\underset{\displaystyle Br}{\underset{|}{C}H_2}{-}CH_2{-}COOH$ (d) $CH_3{-}\underset{\displaystyle Br}{\underset{|}{C}H}{-}COOH$

69. Arrange the following acids in decreasing order of acidity :

$H{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}OH$ (X) $CH_3{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}OH$ (Y)  (Z)

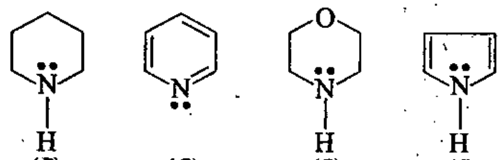
(a) $X > Z > Y$ (b) $X > Y > Z$
(c) $Z > X > Y$ (d) $Z > Y > X$

70. Which of the following acids has lowest pK_a value?

(a) $\underset{\displaystyle NO_2}{\underset{|}{C}H_2}{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}OH$ (b) $\underset{\displaystyle NO_2}{\underset{|}{C}H_2}{-}CH_2{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}OH$

(c) $\underset{\text{Cl}}{\underset{|}{CH_2}}-\overset{O}{\overset{\|}{C}}-OH$ (d) $CH_3-\overset{\text{Cl}}{\overset{|}{\underset{\text{Cl}}{\underset{|}{C}}}}-\overset{O}{\overset{\|}{C}}-OH$

71. Write the order of basic strength :



(P) (Q) (R) (S)

(a) $Q>R>S>P$ (b) $P>R>Q>S$ (c) $R>P>S>Q$ (d) $P>Q>R>S$

72. Write the correct order of acidity :

$H-\overset{O}{\overset{\|}{C}}-OH$ (P); $\begin{matrix}COOH\\|\\COOH\end{matrix}$ (Q); $CH_2\begin{matrix}COOH\\COOH\end{matrix}$ (R); $\begin{matrix}CH_2-COOH\\|\\CH_2-COOH\end{matrix}$ (S)

(a) $P>Q>R>S$ (b) $Q>P>R>S$ (c) $Q>R>S>P$ (d) $S>R>Q>P$

73. Write basicity order of following :

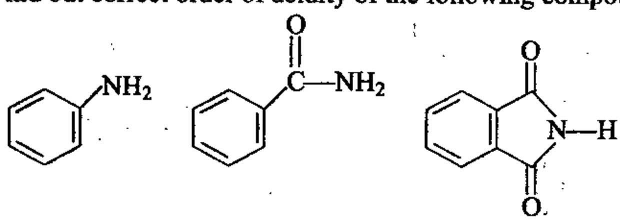
$\underset{(P)}{CH_3-\overset{NH}{\overset{\|}{C}}-NH_2}$; $\underset{(Q)}{CH_3-CH_2-NH_2}$; $\underset{(R)}{(CH_3)_2NH}$; $\underset{(S)}{CH_3-\overset{O}{\overset{\|}{C}}-\ddot{N}H_2}$

(a) $P>S>R>Q$ (b) $R>S>Q>P$ (c) $P>R>Q>S$ (d) $Q>S>R>P$

74. Among the following compounds the strongest acid is :

(a) $HC\equiv CH$ (b) C_6H_6 (c) C_2H_6 (d) CH_3OH

75. Find out correct order of acidity of the following compounds :



$CH_3CH_2NH_2$

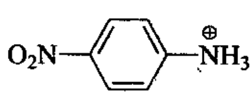
(P) (Q) (R) (S)

(a) $R>Q>P>S$ (b) $P>Q>R>S$ (c) $R>Q>S>P$ (d) $P>S>Q>R$

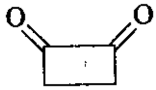
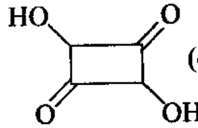
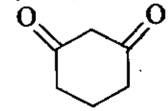
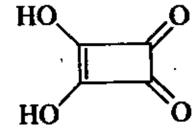
76. Find out strongest acid among the following :

(a) $CH_3-\overset{\oplus}{N}H_3$ (b) $C_6H_5-\overset{\oplus}{N}H_3$

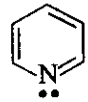
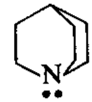
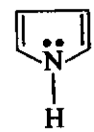
(c) $H_2N-\overset{\oplus NH_2}{\overset{\|}{C}}-NH_2$ (d)



77. Which of the following has the most acidic hydrogen?

(a)  (b)  (c)  (d) 

78. The correct order of decreasing basicity of the compounds is :

$F_3C-\underset{CF_3}{\underset{|}{N}}-CF_3$   

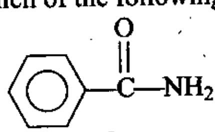
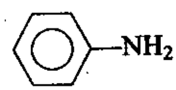
I II III IV

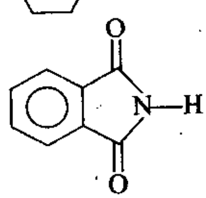
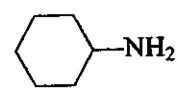
(a) I > II > III > IV (b) III > II > IV > I
(c) II > IV > III > I (d) IV > III > II > I

79. Which of the following has most acidic hydrogen?

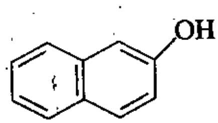
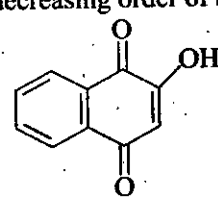
(a) CH_3-NO_2 (b) $CH_3-\overset{O}{\overset{\|}{C}}-H$ (c) $H-C(NO_2)_3$ (d) Ph_3CH

80. Which of the following compounds can react with base to form salt?

(a)  (b) 

(c)  (d) 

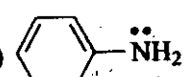
81. Arrange the following compounds in decreasing order of acidity :

CH_3CH_2OH   $H_2C{=}CH_2$

(*P*) (*Q*) (*R*) (*S*)

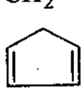
(a) $R > Q > P > S$ (b) $Q > R > P > S$ (c) $S > R > Q > P$ (d) $Q > P > R > S$

82. Which one among the following is the least basic?

(a) CH_3NH_2 (b) $\ddot{N}H_3$ (c) $CH_3CH_2NH_2$ (d) 

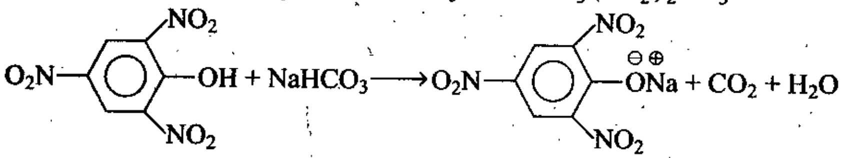
83. Which of the following compounds contain most acidic H?

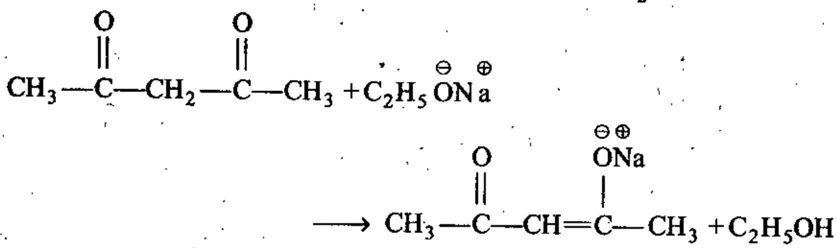
(a) $CH_2{=}CH_2$ (b) $HC{\equiv}CH$

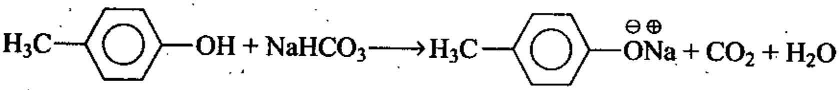
(c)  (d) $CH_2{=}CH-CH_2-CH{=}CH_2$

84. Which of the following reactions does not proceed in forward direction?

(a) $Ph_3C{-}H + CH_3(CH_2)_3Na \longrightarrow Ph_3CNa + CH_3(CH_2)_2CH_3$

(b) 

(c) 

(d) 

85. Which of the following reactions does not proceed in forward direction?

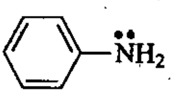
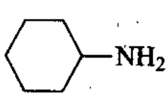
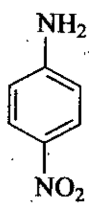
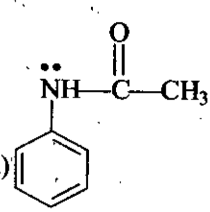
(a) $CH_3CH_2SH + NaOH \longrightarrow CH_3CH_2SNa + H_2O$

(b) $CH_3CH_2OH + CH_3MgBr \longrightarrow CH_3CH_2OMgBr + CH_4$

(c) $CH_3CH_2OH + NaOH \longrightarrow CH_3CH_2ONa + H_2O$

(d) $CH_3CH_2OH + NaH \longrightarrow CH_3CH_2ONa + H_2$

86. Which of the following compounds is strongest base?

(a)  (b)  (c)  (d) 

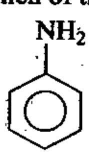
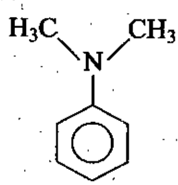
87. Give the correct order of decreasing acidity :

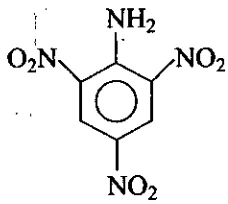
C_2H_5SH	C_2H_5OH	$C_2H_5NH_2$	$CH_3CH_2CH_3$
(1)	(2)	(3)	(4)

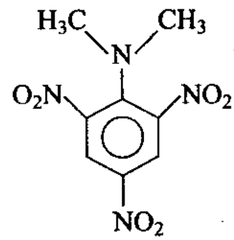
(a) $2 > 1 > 3 > 4$ (b) $3 > 2 > 1 > 4$

(c) $1 > 2 > 3 > 4$ (d) $3 > 4 > 2 > 1$

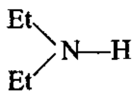
88. Which of the following is the strongest base?

(a)  (b) 

(c) 

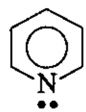
(d) 

89. Arrange the following compounds in decreasing order of basicity :

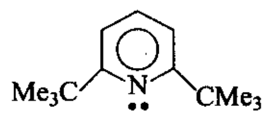


(P)

Et_3N
(Q)



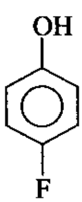
(R)

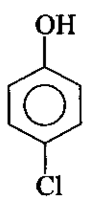


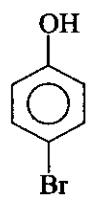
(S)

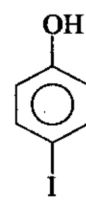
(a) $P > Q > R > S$ (b) $Q > P > R > S$ (c) $R > S > Q > P$ (d) $Q > P > S > R$

90. Which of the phenol derivative is most acidic?

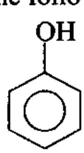
(a) 

(b) 

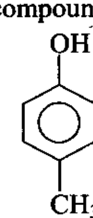
(c) 

(d) 

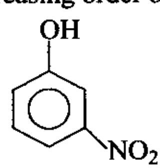
91. Arrange the following compounds in increasing order of acidity :



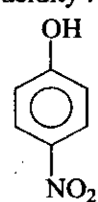
(P)



(Q)



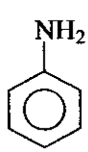
(R)



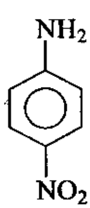
(S)

(a) $P > Q > R > S$ (b) $S > Q > R > P$ (c) $S > R > P > Q$ (d) $R > S > P > Q$

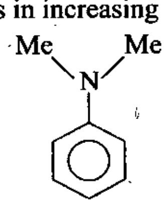
92. Arrange the following compounds in increasing order of basicity :



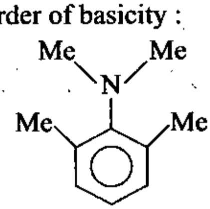
(P)



(Q)



(R)



(S)

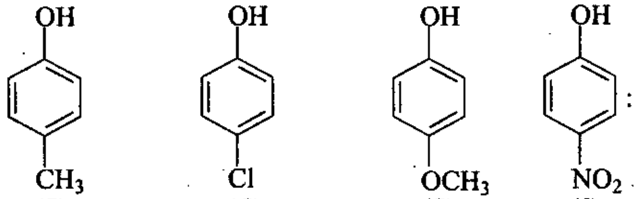
(a) $S > R > Q > P$

(b) $S > R > P > Q$

(c) $P > Q > R > S$

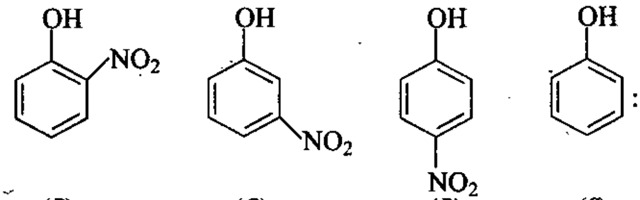
(d) $R > Q > P > S$

⇒ **The decreasing order of acidity of following phenol derivatives is (Question No. 93-100).**

93. 

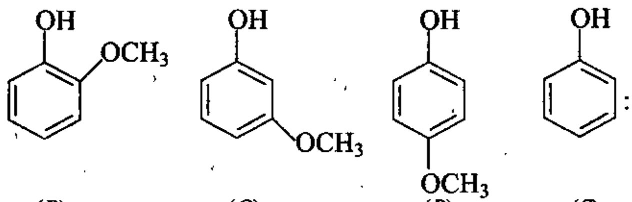
(*P*) (*Q*) (*R*) (*S*)

(a) $S>P>Q>R$ (b) $R>S>P>Q$ (c) $S>Q>P>R$ (d) $P>Q>R>S$

94. 

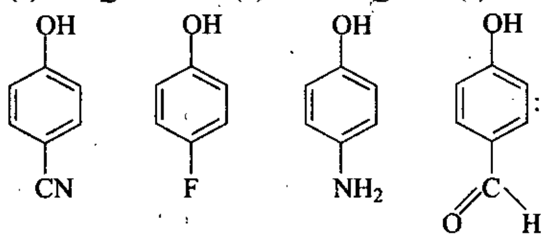
(*P*) (*Q*) (*R*) (*S*)

(a) $R>P>Q>S$ (b) $P>R>Q>S$ (c) $R>Q>P>S$ (d) $S>Q>P>R$

95. 

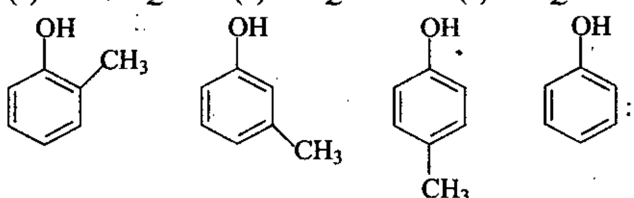
(*P*) (*Q*) (*R*) (*S*)

(a) $P>Q>R>S$ (b) $S>R>Q>P$ (c) $S>R>P>Q$ (d) $Q>S>R>P$

96. 

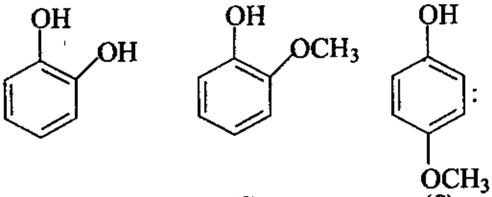
(*P*) (*Q*) (*R*) (*S*)

(a) $P>S>Q>R$ (b) $S>Q>P>R$ (c) $R>Q>P>S$ (d) $P>Q>R>S$

97. 

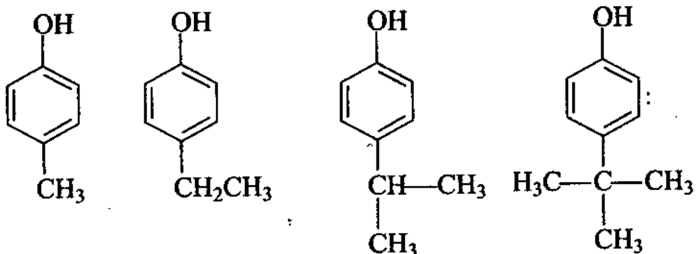
(*P*) (*Q*) (*R*) (*S*)

(a) $S>Q>P>R$ (b) $S>Q>R>P$ (c) $P>Q>R>S$ (d) $R>S>Q>P$

98. 

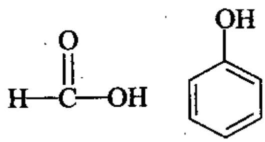
(P) (Q) (R)

(a) $P > Q > R$ (b) $R > Q > P$ (c) $Q > P > R$ (d) $P > R > Q$

99. 

(P) (Q) (R) (S)

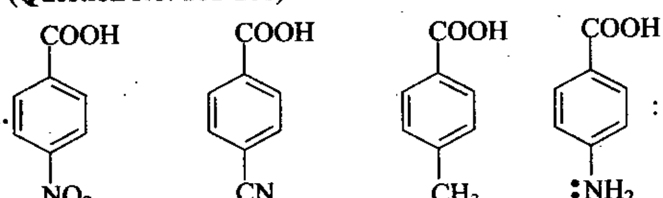
(a) $P > Q > R > S$ (b) $Q > R > P > S$ (c) $S > R > Q > P$ (d) $R > S > Q > P$

100. CH_3OH  $CH_3—\ddot{N}H_2$:

(P) (Q) (R) (S)

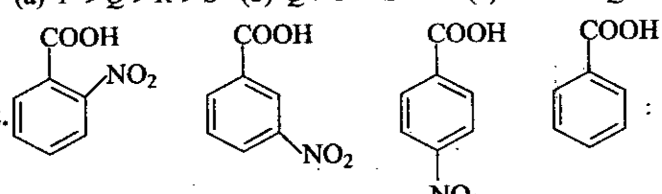
(a) $Q > R > P > S$ (b) $R > Q > P > S$ (c) $S > R > Q > P$ (d) $Q > P > S > R$

⇒ **The decreasing order acidity of following benzoic acid derivatives is (Question No. 101-108).**

101. 

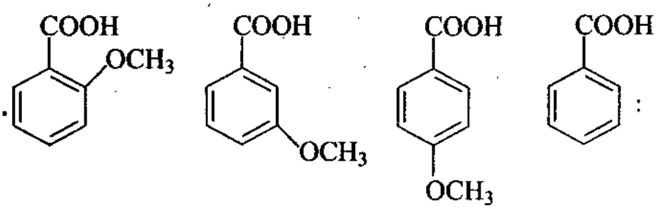
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > P > S > R$ (c) $S > R > Q > P$ (d) $R > S > P > Q$

102. 

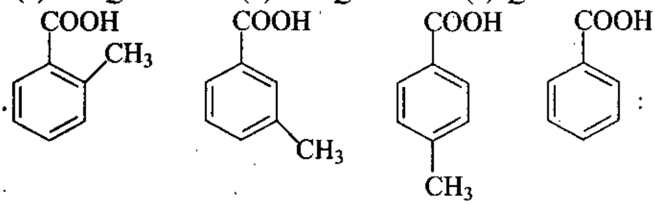
(P) (Q) (R) (S)

(a) $P > Q > R > S$
(b) $P > R > Q > S$
(c) $R > P > Q > S$
(d) $S > R > Q > P$

103. 

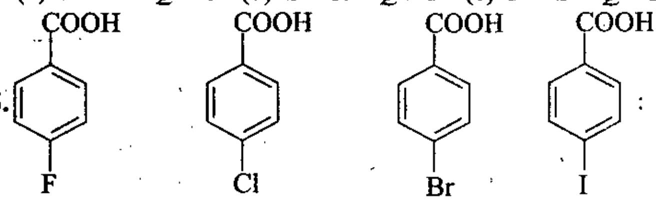
(*P*) (*Q*) (*R*) (*S*)

(a) $S > Q > R > P$ (b) $R > Q > P > S$ (c) $Q > R > S > P$ (d) $P > Q > S > R$

104. 

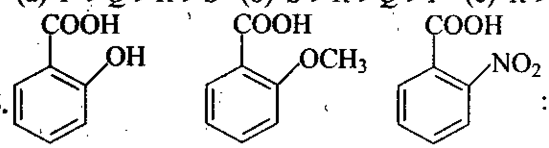
(*P*) (*Q*) (*R*) (*S*)

(a) $P > R > Q > S$ (b) $S > R > Q > P$ (c) $P > S > Q > R$ (d) $Q > S > P > R$

105. 

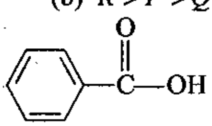
(*P*) (*Q*) (*R*) (*S*)

(a) $P > Q > R > S$ (b) $S > R > Q > P$ (c) $R > Q > P > S$ (d) $Q > P > S > R$

106. 

(*P*) (*Q*) (*R*)

(a) $P > Q > R$ (b) $R > P > Q$ (c) $Q > R > P$ (d) $P > R > Q$

107. $H-\overset{\overset{\displaystyle O}{\|}}{C}-OH$  $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-OH$:

(*P*) (*Q*) (*R*)

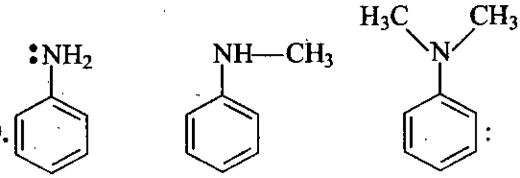
(a) $R > Q > P$ (b) $Q > P > R$ (c) $P > Q > R$ (d) $Q > R > P$

108. $\underset{(P)}{O_2N-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OH}$ $\underset{(Q)}{Me_3\overset{\oplus}{N}-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OH}$ $\underset{(R)}{NC-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OH}$

$\underset{(S)}{HO-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OH}$:

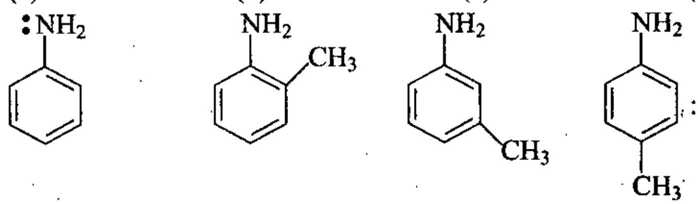
(a) $Q > R > P > S$ (b) $R > Q > P > S$ (c) $S > Q > P > R$ (d) $S > R > Q > P$

⇒ **The decreasing order of basicity of following aniline derivatives is (Question No. 109-117).**

109. 

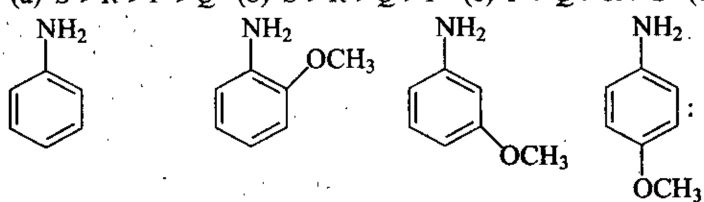
(X) (Y) (Z)

(a) $X > Y > Z$ (b) $Y > Z > X$ (c) $Z > Y > X$ (d) $X > Z > Y$

110. 

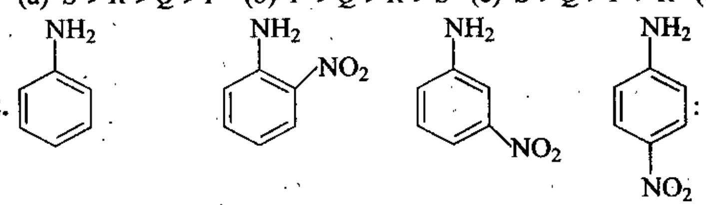
(P) (Q) (R) (S)

(a) $S > R > P > Q$ (b) $S > R > Q > P$ (c) $P > Q > R > S$ (d) $Q > S > R > P$

111. 

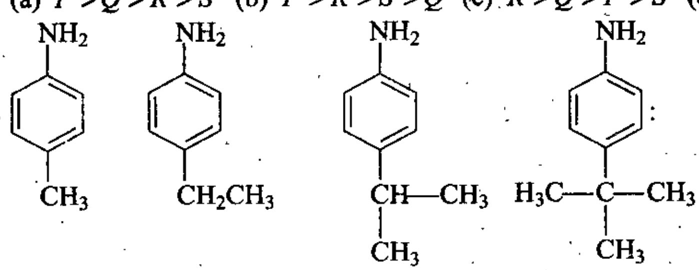
(P) (Q) (R) (S)

(a) $S > R > Q > P$ (b) $P > Q > R > S$ (c) $S > Q > P > R$ (d) $S > P > Q > R$

112. 

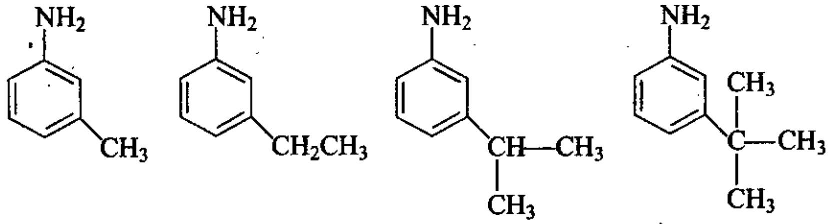
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $P > R > S > Q$ (c) $R > Q > P > S$ (d) $S > R > Q > P$

113. 

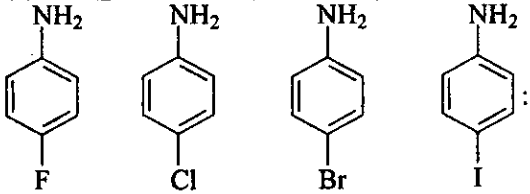
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > S > R > P$
(c) $S > R > Q > P$ (d) $R > S > Q > P$

114.  :

(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $S > R > Q > P$ (c) $S > P > R > Q$ (d) $R > Q > P > S$

115.  :

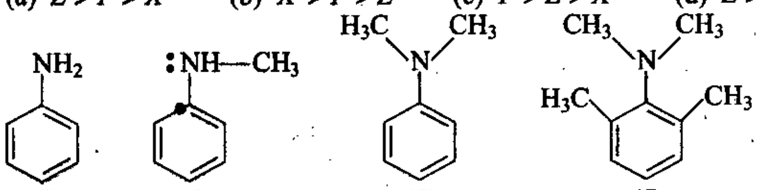
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $R > Q > P > S$ (c) $S > R > Q > P$ (d) $Q > R > S > P$

116. $Ph-\ddot{N}H_2$, $Ph-\underset{H}{\ddot{N}}-Ph$, $Ph-\underset{Ph}{\ddot{N}}-Ph$:

(X) (Y) (Z)

(a) $Z > Y > X$ (b) $X > Y > Z$ (c) $Y > Z > X$ (d) $Z > X > Y$

117.  :

(P) (Q) (R) (S)

(a) $R > S > Q > P$ (b) $P > Q > R > S$ (c) $R > Q > P > S$ (d) $S > R > Q > P$

⇒ **Arrange the following compounds in decreasing order of acidity (Question No. 118-125).**

118. $\underset{(P)}{CH_3CH_2CH_2-COOH}$, $CH_3CH_2\underset{Br}{CH}-COOH$ (Q), $\underset{Cl}{CH_2}-CH_2-CH_2-COOH$ (R),

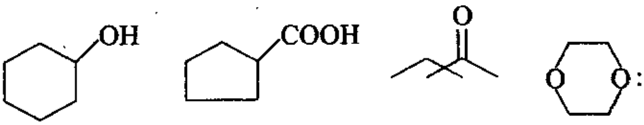
$CH_3{=}CH_2{=}\underset{Cl}{\overset{Cl}{C}}{=}COOH$:

(S)

(a) $P > Q > R > S$ (b) $Q > R > S > P$ (c) $S > Q > R > P$ (d) $S > R > Q > P$

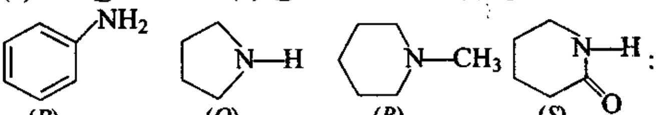
119. $\underset{(P)}{C_6H_5CH_2OH}$, $\underset{(Q)}{C_6H_5COOH}$, $\underset{(R)}{C_6H_5OCH_3}$, $\underset{(S)}{C_6H_5OH}$:

(a) $Q > S > P > R$ (b) $P > Q > R > S$ (c) $Q > P > S > R$ (d) $R > Q > S > P$

120. 

(P) (Q) (R) (S)

(a) $P > Q > S > R$ (b) $Q > R > S > P$ (c) $Q > P > R > S$ (d) $R > P > Q > S$

121. 

(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $R > Q > P > S$ (c) $S > P > R > Q$ (d) $S > P > Q > R$

122. $CH_2(C{\equiv}N)_2$ $\quad CH_2(NO_2)_2$ $\quad H{-}C{\equiv}N$ $\quad R{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}OC_2H_5$:

(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > P > R > S$
(c) $Q > R > P > S$ (d) $S > Q > P > R$

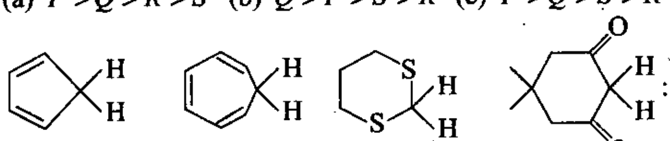
123. $\underset{(P)}{CH_2(COOC_2H_5)_2}$, $\underset{(Q)}{CH_3COCH_2CO_2C_2H_5}$, $\underset{(R)}{(CH_3CO)_2CH_2}$, $\underset{(S)}{R{-}C{\equiv}CH}$:

(a) $R > Q > P > S$ (b) $P > R > Q > S$ (c) $S > R > Q > P$ (d) $P > Q > R > S$

124. $R{-}CH_2{-}\overset{\oplus}{N}(=O){-}O^{\ominus}$ $\quad R{-}\overset{O}{\overset{\|}{\underset{O}{\underset{\|}{S}}}}{-}CH_3$ $\quad (C_6H_5)_3CH$ $\quad R{-}\overset{O}{\overset{\|}{C}}{-}CH_3$:

(P) (Q) (R) (S)

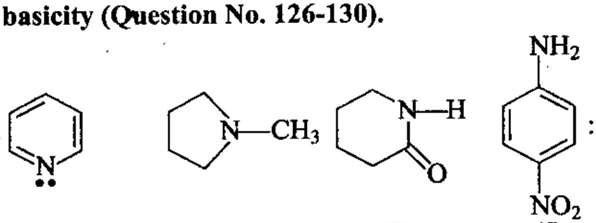
(a) $P > Q > R > S$ (b) $Q > P > S > R$ (c) $P > Q > S > R$ (d) $R > S > P > Q$

125. 

(P) (Q) (R) (S)

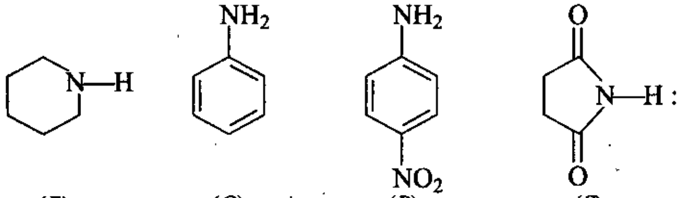
(a) $S > P > R > Q$ (b) $P > S > R > Q$
(c) $R > P > S > Q$ (d) $P > Q > R > S$

⇒ **Arrange the following nitrogen containing compounds in decreasing order of basicity (Question No. 126-130).**

126. 

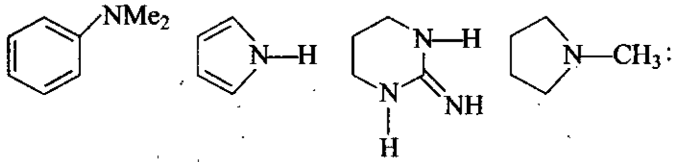
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > P > R > S$ (c) $Q > P > S > R$ (d) $S > P > Q > R$

127. 

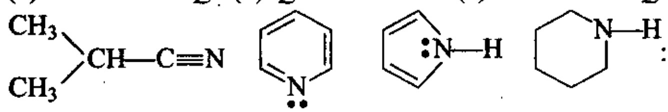
(P) (Q) (R) (S)

(a) $S > R > Q > P$ (b) $P > Q > S > R$ (c) $P > Q > R > S$ (d) $R > Q > P > S$

128. 

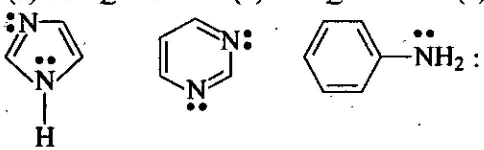
(P) (Q) (R) (S)

(a) $R > S > P > Q$ (b) $Q > P > R > S$ (c) $S > R > P > Q$ (d) $R > S > Q > P$

129. 

(P) (Q) (R) (S)

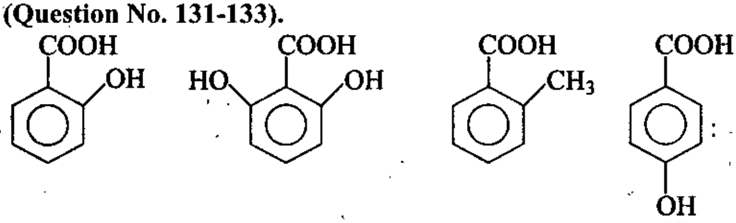
(a) $R > Q > S > P$ (b) $P > Q > R > S$ (c) $Q > P > S > R$ (d) $S > Q > R > P$

130. 

(X) (Y) (Z)

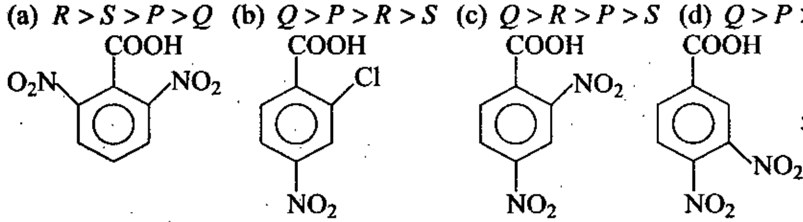
(a) $X > Y > Z$ (b) $Y > X > Z$ (c) $Z > X > Y$ (d) $X > Z > Y$

⇒ **The correct order of decreasing acid strength of following carboxylic acids is (Question No. 131-133).**

131. 

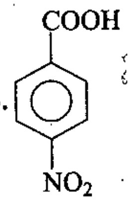
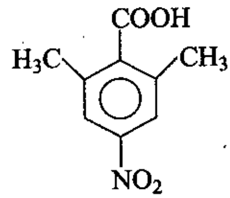
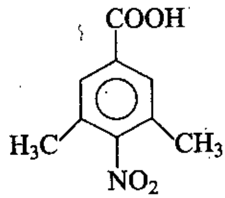
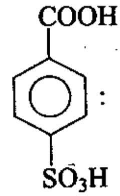
(P) (Q) (R) (S)

(a) $R > S > P > Q$ (b) $Q > P > R > S$ (c) $Q > R > P > S$ (d) $Q > P > S > R$

132. 

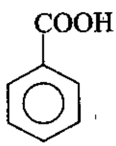
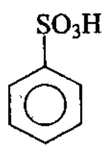
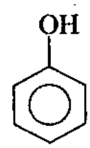
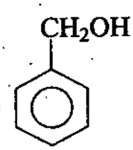
(P) (Q) (R) (S)

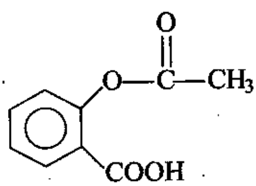
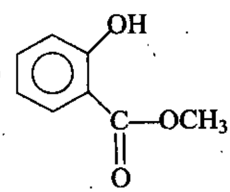
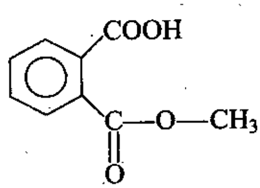
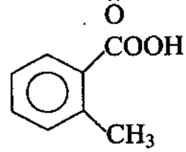
(a) $R > P > S > Q$ (b) $P > R > Q > S$
(c) $Q > R > P > S$ (d) $S > R > Q > P$

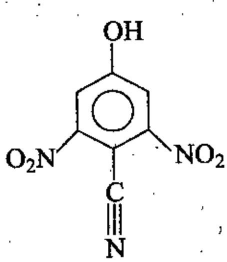
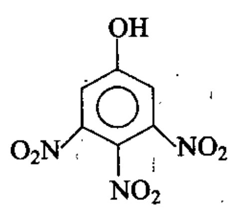
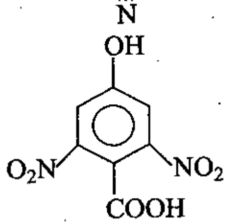
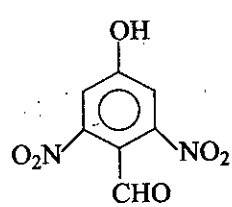
133. 
(*P*)

(*Q*)

(*R*)

(*S*) :

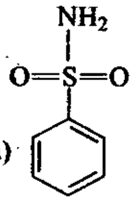
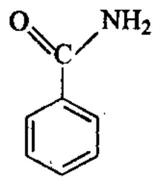
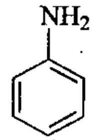
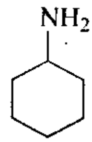
(a) $P > Q > R > S$
(b) $S > R > P > Q$
(c) $S > Q > P > R$
(d) $S > R > Q > P$

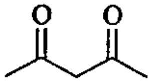
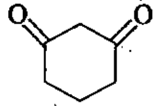
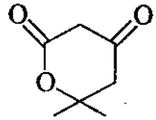
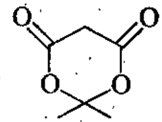
⇒ **Among the following compounds which is strongest acid (Question No. 134-139).**

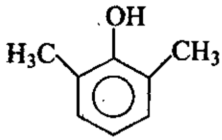
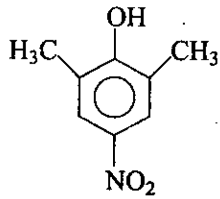
134. (a) 
(b) 
(c) 
(d) 

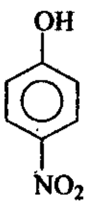
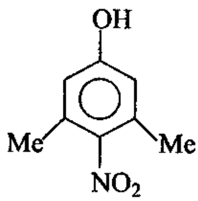
135. (a) 
(b) 
(c) 
(d) 

136. (a) 
(b) 
(c) 
(d) 

137. (a)  (b)  (c)  (d) 

138. (a)  (b)  (c)  (d) 

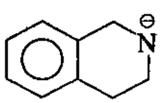
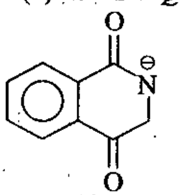
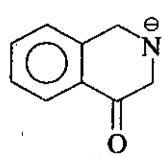
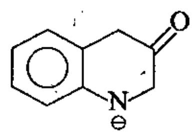
139. (a)  (b) 

(c)  (d) 

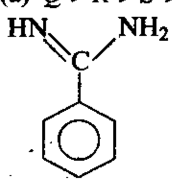
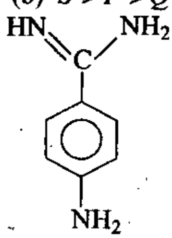
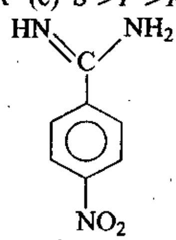
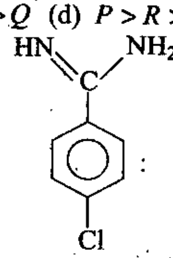
⇒ **Arrange the following compounds in decreasing order of basicity (Question No. 140-145).**

140. $Me_3\overset{\ominus}{C}$ (*P*) $Me_2\overset{\ominus}{N}$ (*Q*) $Me_3C\overset{\ominus}{O}$ (*R*) $Me\overset{\ominus}{O}$ (*S*) :

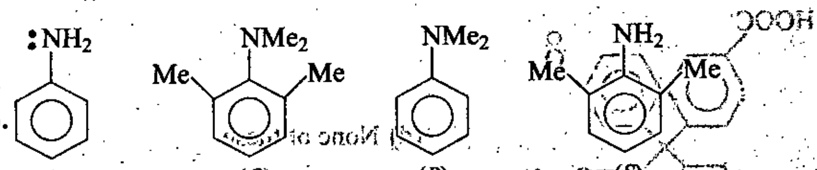
(a) $P>Q>R>S$ (b) $R>S>Q>P$ (c) $P>Q>S>R$ (d) $Q>S>R>P$

141.  (*P*)  (*Q*)  (*R*)  (*S*) :

(a) $Q>R>S>P$ (b) $S>P>Q>R$ (c) $S>P>R>Q$ (d) $P>R>S>Q$

142.  (*P*)  (*Q*)  (*R*)  (*S*) :

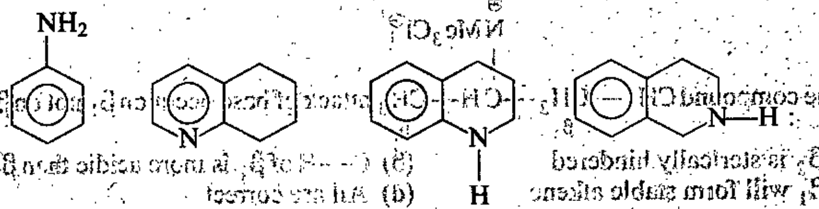
(a) $Q>P>S>R$ (b) $R>P>S>Q$ (c) $R>S>P>Q$ (d) $Q>S>P>R$

143. 

(P) (Q) (R) (S)

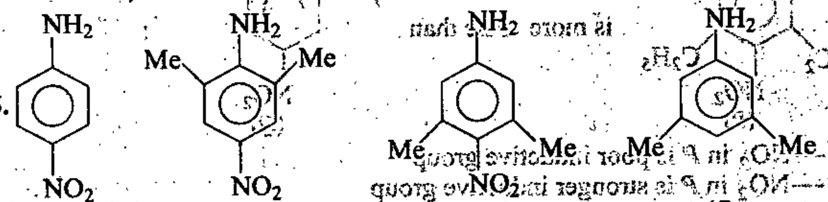
(a) $P > Q > R > S$ (b) $Q > R > S > P$

(c) $Q > R > P > S$ (d) $S > R > Q > P$

144. 

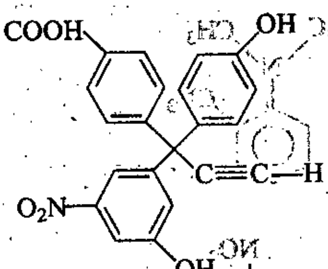
(P) (Q) (R) (S)

(a) $P > S > R > Q$ (b) $S > R > P > Q$ (c) $S > Q > R > P$ (d) $S > R > Q > P$

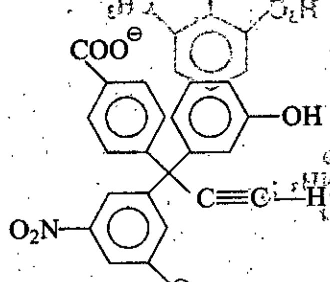
145. 

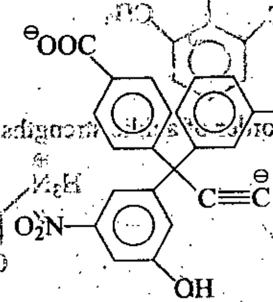
(P) (Q) (R) (S)

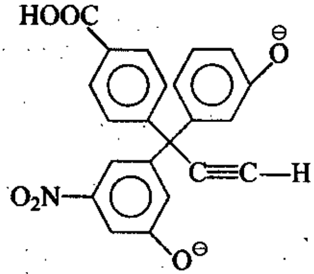
(a) $S > Q > R > P$ (b) $R > S > Q > P$ (c) $S > R > P > Q$ (d) $P > R > Q > S$

146. 

$\xrightarrow{\text{2 Mole NaNH}_2}$ A; Product A will be :

(a) 

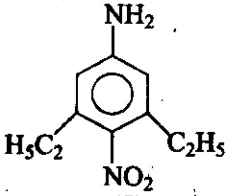
(b) 

(c) 

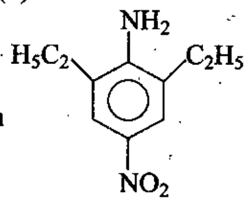
(d) None of these

147. In the compound $CH_3—\underset{\beta_2}{CH_2}—\overset{\overset{\oplus}{N}Me_3Cl^{\ominus}}{CH}—\underset{\beta_1}{CH_3}$ attack of base occur on β_1 not on β_2 :

(a) β_2 is sterically hindered
(b) C—H of β_1 is more acidic than β_2
(c) β_1 will form stable alkene
(d) All are correct

148. 
(*P*)

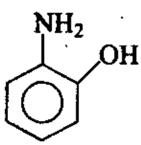
is more basic than

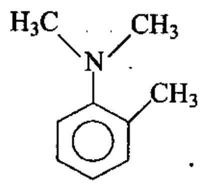

(*Q*)

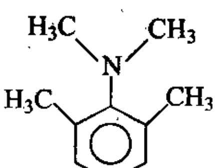
:

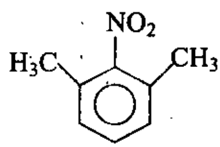
(a) $—NO_2$ in *P* is poor inductive group
(b) $—NO_2$ in *P* is stronger inductive group
(c) $—NO_2$ in *P* is stronger $-M$ group
(d) $—NO_2$ in *P* is weaker $-M$ group

149. Steric inhibition is not applicable in :

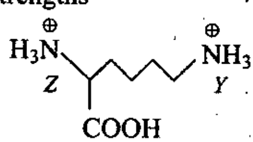
(a) 

(b) 

(c) 

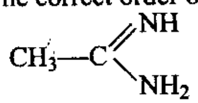
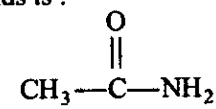
(d) 

150. Correct order of acidic strengths


is :

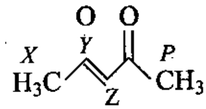
(a) $X > Y > Z$ (b) $Z > Y > X$ (c) $Y > Z > X$ (d) $X > Z > Y$

151. The correct order of basicities of following compounds is :


(1)
$CH_3CH_2NH_2$
(2)
$(CH_3)_2NH$
(3)

(4)

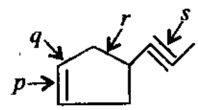
(a) $2 > 1 > 3 > 4$ (b) $1 > 3 > 2 > 4$ (c) $3 > 1 > 2 > 4$ (d) $1 > 2 > 3 > 4$

152. The abstraction of proton will be fastest in which carbon in the following compound?



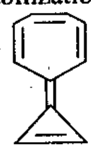
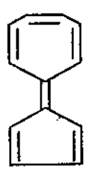
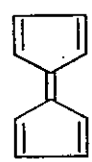
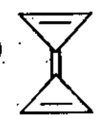
(a) X (b) Y (c) Z (d) P

153. What is the increasing order of bond lengths of bonds indicated as p, q, r and s in following compound?

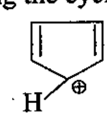
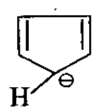
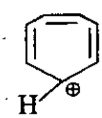
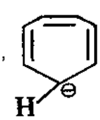


(a) $p < q < r < s$ (b) $q < r < s < p$ (c) $s < q < r < p$ (d) $s < p < q < r$

154. Which of the following molecules is expected to have the greatest resonance stabilization?

(a)  (b)  (c)  (d) 

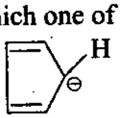
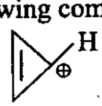
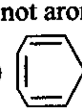
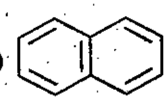
155. Among the cyclic ions;


(P)

(Q)

(R)

(S)

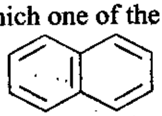
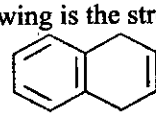
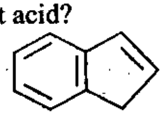
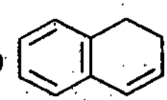
the aromatic character is shown by :

(a) P and S (b) Q and S (c) Q and R (d) P, Q, R and S

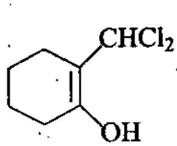
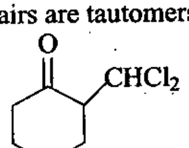
156. Which one of the following compounds is not aromatic?

(a)  (b)  (c)  (d) 

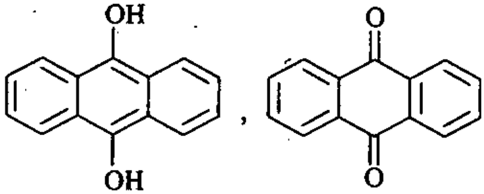
157. Which one of the following is the strongest acid?

(a)  (b)  (c)  (d) 

158. Which of following pairs are tautomers?

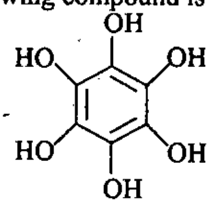
(a)  , 

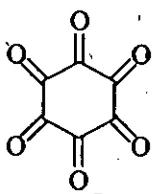
(b) $CH_3-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-H$, $CH_2=CH-CH_2-OH$

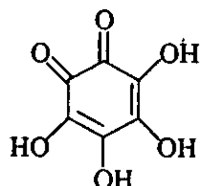
(c) 

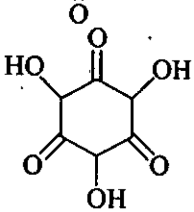
(d) $CH_3-\underset{\underset{\displaystyle O}{\|}}{C}-\underset{\underset{\displaystyle O}{\|}}{C}-CH_3$, $CH_3-\underset{\underset{\displaystyle OH}{|}}{C}=\underset{\underset{\displaystyle OH}{|}}{C}-CH_3$

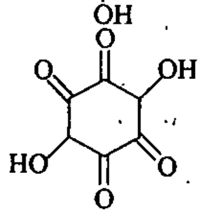
159. The keto isomer of the following compound is :



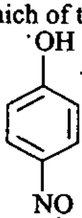
(a) 

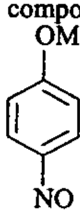
(b) 

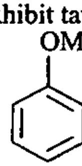
(c) 

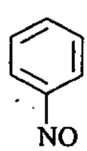
(d) 

160. Which of the following compounds will exhibit tautomerism?

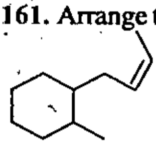
(a) 

(b) 

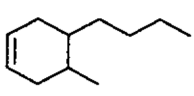
(c) 

(d) 

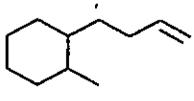
161. Arrange the following compounds in increasing order of their heat of combustion :



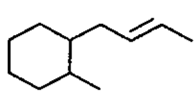
(P)



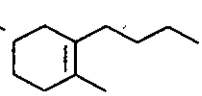
(Q)



(R)



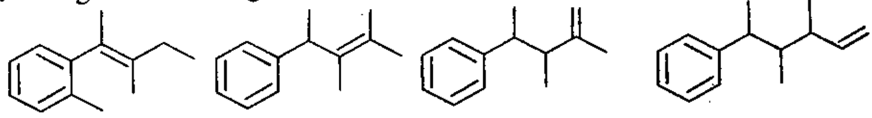
(S)



(T)

(a) $P < Q < R < S < T$
(b) $T < S < P < Q < R$
(c) $Q < P < R < T < S$
(d) $R < S < T < Q < P$

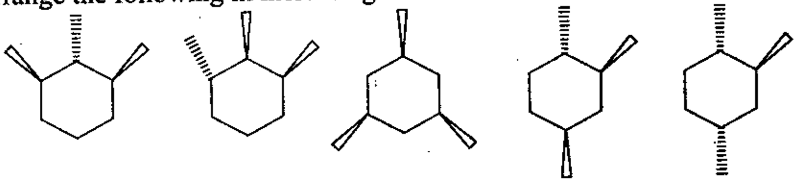
162. Arrange the following in increasing order of their heat of hydrogenation :



(P) (Q) (R) (S)

(a) $P < Q < R < S$ (b) $S < R < Q < P$ (c) $S < R < P < Q$ (d) $P < Q < S < R$

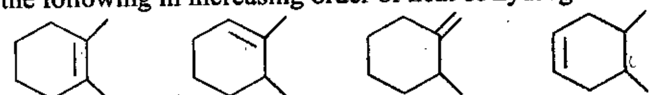
163. Arrange the following in increasing order of their heat of combustion :



(P) (Q) (R) (S) (T)

(a) $P < Q < R < S < T$
(b) $S < P < R < Q < T$
(c) $R < Q < P < S < T$
(d) $T < S < R < P < Q$

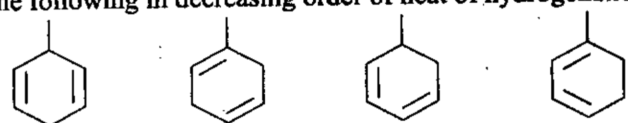
164. Arrange the following in increasing order of heat of hydrogenation :



(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > P > S > R$ (c) $R > S > Q > P$ (d) $Q > S > R > P$

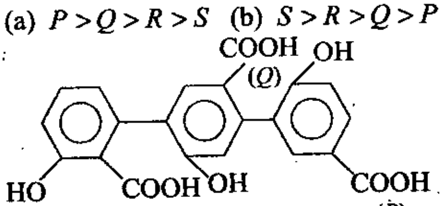
165. Arrange the following in decreasing order of heat of hydrogenation :



(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $S > R > Q > P$ (c) $Q > P > S > R$ (d) $R > Q > P > S$

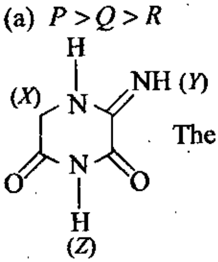
166.



The correct acidic strength order of acidic hydrogen P, Q and R is respectively :

(a) $P > Q > R$ (b) $P > R > Q$ (c) $R > Q > P$ (d) $Q > R > P$

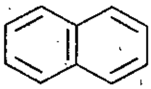
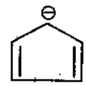
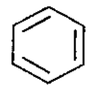
167.



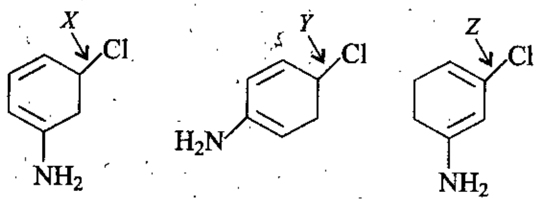
The correct basicity order of atoms X, Y and Z is :

(a) $X > Y > Z$ (b) $Z > Y > X$ (c) $Z > X > Y$ (d) $Y > X > Z$

168. Which of the following compounds do not have all C—C bonds of same length?

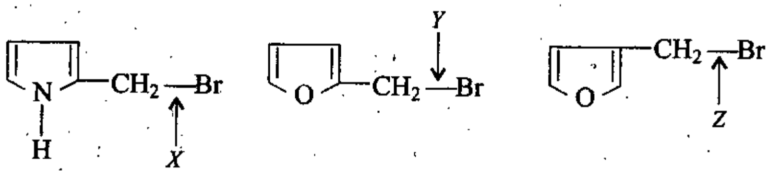
(a)  (b)  (c)  (d) 

169. Find out correct order for the energy required for heterolytic cleavage of indicated C—Cl bonds forming carbocation :



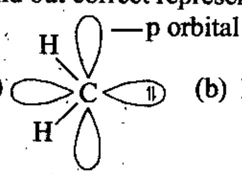
(a) $X > Y > Z$ (b) $Z > Y > X$ (c) $Z > X > Y$ (d) $Y > X > Z$

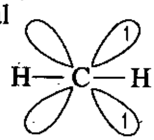
170. Find out correct order for the energy required for heterolytic cleavage of indicated C—Br bonds forming carbocation :



(a) $Z > Y > X$ (b) $X > Y > Z$ (c) $Y > X > Z$ (d) $Z > X > Y$

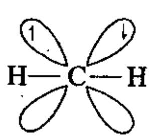
171. Find out correct representation of singlet carbene :

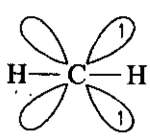
(a) 

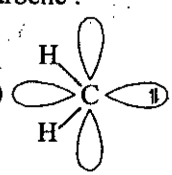
(b) 

(c) Both (a) and (b) (d) None of these

172. Find out correct representation of triplet carbene :

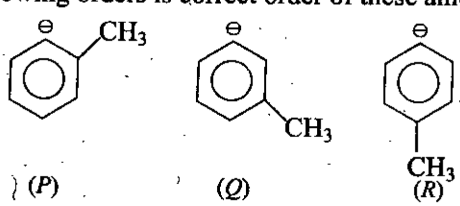
(a) 

(b) 

(c) 

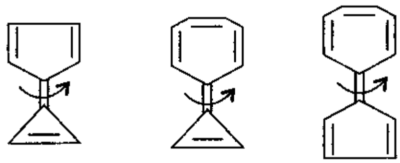
(d) None of these

173. Which of the following orders is correct order of these anions?



(a) $Q > R > P$ (b) $Q > P > R$ (c) $R > Q > P$ (d) $P > Q > R$

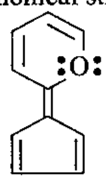
174. The barrier for rotation about indicated bonds will be maximum in which of these compounds?

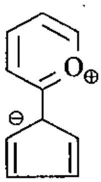
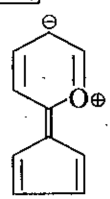
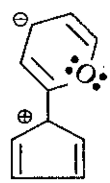


(X) (Y) (Z)

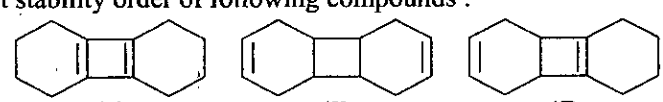
(a) X (b) Y (c) Z (d) Same in all

175. The most stable canonical structure of this molecule is :



(a)  (b)  (c)  (d) None of these

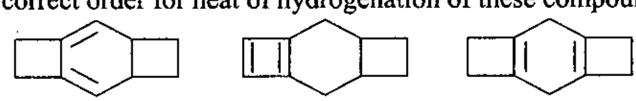
176. Find out stability order of following compounds :



(X) (Y) (Z)

(a) $Z > X > Y$ (b) $Z > Y > X$ (c) $Y > Z > X$ (d) $X > Y > Z$

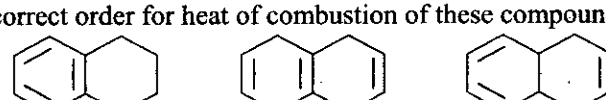
177. Find out correct order for heat of hydrogenation of these compounds :



(X) (Y) (Z)

(a) $Y > X > Z$ (b) $Y > Z > X$ (c) $X > Y > Z$ (d) $Z > X > Y$

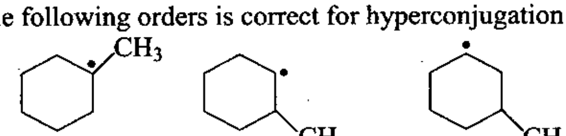
178. Find out correct order for heat of combustion of these compounds :



(X) (Y) (Z)

(a) $X > Y > Z$ (b) $Z > Y > X$ (c) $Y > Z > X$ (d) $Z > X > Y$

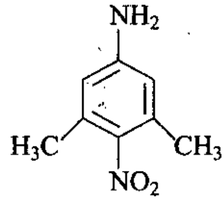
179. Which of the following orders is correct for hyperconjugation of these radicals?



(P) (Q) (R)

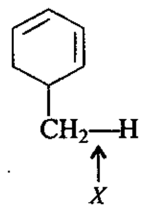
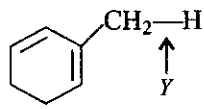
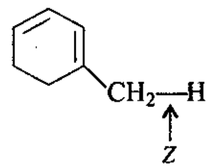
(a) $P > Q > R$ (b) $R > Q > P$ (c) $Q > P > R$ (d) $P > R > Q$

180. Which of the following effects of —NO_2 group operates on —NH_2 group in this molecule?



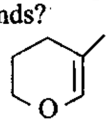
(a) Only $-I$ effect
(b) Only $-M$ effect
(c) Both $-I$ and $-M$ effect
(d) Only $+M$ effect

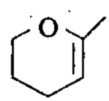
181. Which of the following is the correct order for bond energy for C—H bonds in these compounds?

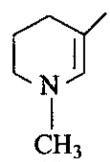




(a) $Y > Z > X$ (b) $X > Z > Y$ (c) $X > Y > Z$ (d) $Z > X > Y$

182. Which of the following orders is correct for the magnitude of $+M$ power among these compounds?

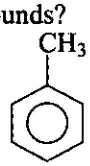

(X)

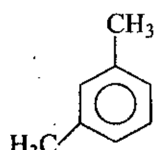

(Y)

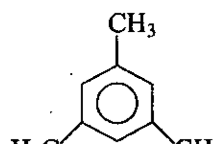

(Z)

(a) $Z > Y > X$ (b) $Y > X > Z$ (c) $X > Y > Z$ (d) $Z > X > Y$

183. Which of the following orders is correct for heat of hydrogenation of these compounds?

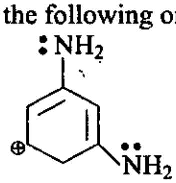

(X)

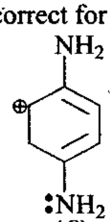

(Y)

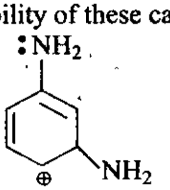

(Z)

(a) $X > Y > Z$ (b) $Z > Y > X$ (c) $Y > Z > X$ (d) $Z > X > Y$

184. Which of the following orders is correct for the stability of these carbocations?

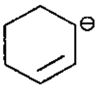
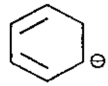
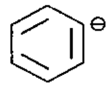
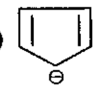

(P)


(Q)

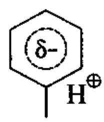
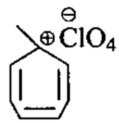
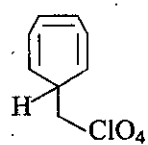

(R)

(a) $Q > R > P$ (b) $P > Q > R$ (c) $Q > P > R$ (d) $R > P > Q$

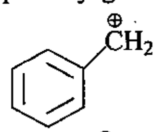
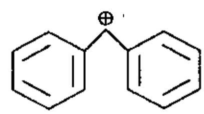
185. Which of the following anions is resonance destabilized?

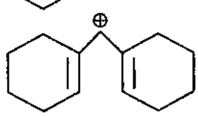
(a)  (b)  (c)  (d) 

186.  $\xrightarrow{HClO_4}$ X, 'X' will be :

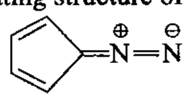
(a)  (b)  (c)  (d) None of these

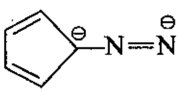
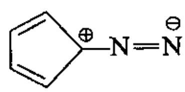
187. Hyperconjugation occurs in :

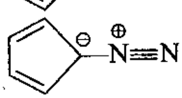
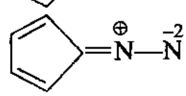
(a)  (b) 

(c)  (d) None of these

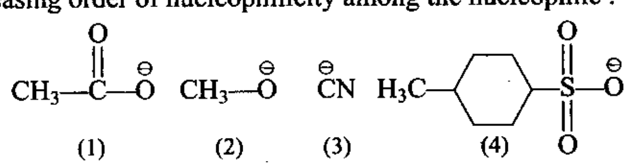
188. The most stable resonating structure of the following molecule is :



(a)  (b) 

(c)  (d) 

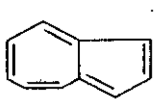
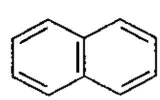
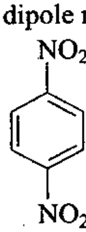
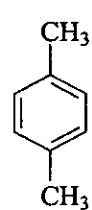
189. The decreasing order of nucleophilicity among the nucleophile :



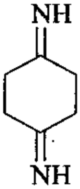
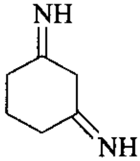
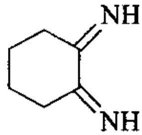
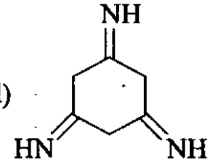
(1) (2) (3) (4)

(a) 1, 2, 3, 4 (b) 4, 3, 2, 1 (c) 2, 3, 1, 4 (d) 3, 2, 1, 4

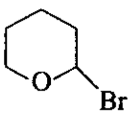
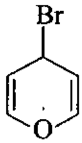
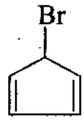
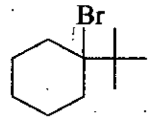
190. Which of the following compounds have a dipole moment?

(a)  (b)  (c)  (d) 

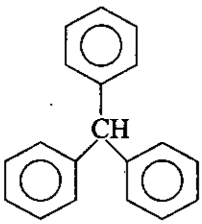
191. Which of the following is the least stable?

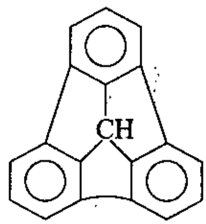
(a)  (b)  (c)  (d) 

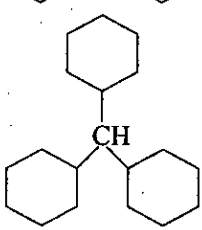
192. Among the following which is more reactive toward $AgNO_3$?

(a)  (b)  (c)  (d) 

193. Identify the compound which contain most acidic hydrogen :

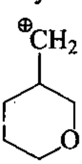
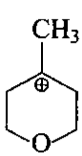
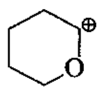
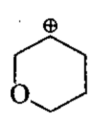
(a) 

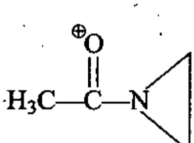
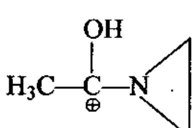
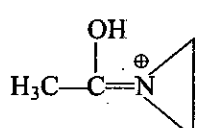
(b) 

(c) 

(d) $H_3C-\overset{CH_3}{\underset{CH_3}{C}}-H$

194. Identify the most stable structure among the following :

(a)  (b)  (c)  (d) 

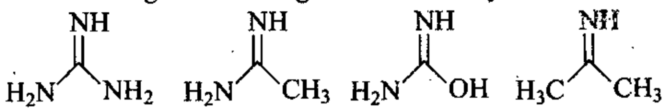
195.   

(X) (Y) (Z)

The correct stability order of the given canonical structure is :

(a) $X > Y > Z$
(b) $Z > X > Y$
(c) $X > Z > Y$
(d) $Y > Z > X$

196. Arrange the following in increasing order of basicity :

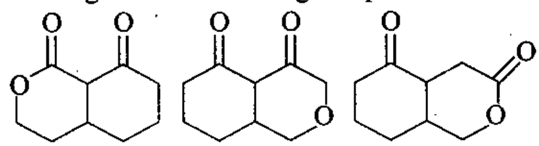


(P) (Q) (R) (S)

(a) $S < Q < R < P$ (b) $S < Q < P < R$

(c) $S < R < P < Q$ (d) $P < Q < R < S$

197. Compare acidic strength of the following compound.

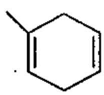
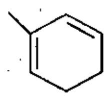
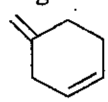
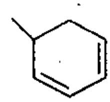


(P) (Q) (R)

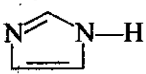
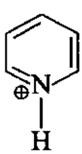
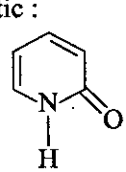
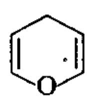
(a) $P > Q > R$ (b) $Q > P > R$

(c) $R > P > Q$ (d) $R > P > Q$

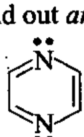
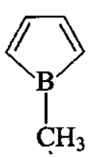
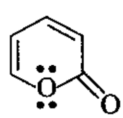
198. Select the most stable structure among following :

(a)  (b)  (c)  (d) 

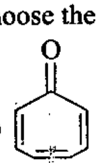
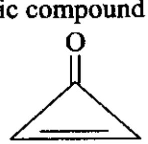
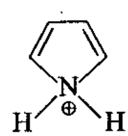
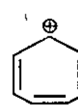
199. Identify the compound which is not aromatic :

(a)  (b)  (c)  (d) 

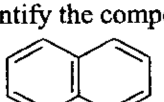
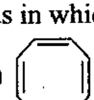
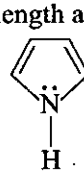
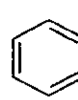
200. Find out *anti* aromatic compound among the following :

(a)  (b)  (c)  (d) 

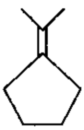
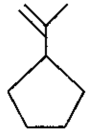
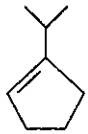
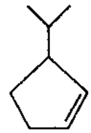
201. Choose the non aromatic compound among the following :

(a)  (b)  (c)  (d) 

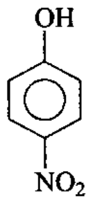
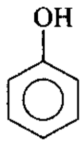
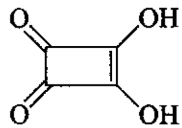
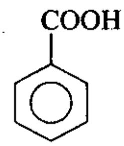
202. Identify the compounds in which all bond length are equal :

(a)  (b)  (c)  (d) 

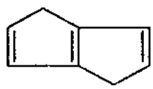
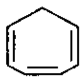
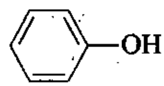
203. Which of the following alkene has highest value of heat of hydrogenation?

(a)  (b)  (c)  (d) 

204. Which of the following compound will not liberate CO_2 on reaction with NaOH?

(a)  (b)  (c)  (d) 

205. Which of the following will not react with Na metal?

(a)  (b)  (c)  (d) 

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which of the following are electrophiles?

(a) BF_3 (b) $:CCl_2$ (c) $\overset{\oplus}{N}H_4$ (d) $I^{\ominus}$

2. Which of the following statements are correct for butadiene?

$$\overset{4}{C}H_2=\overset{3}{C}H-\overset{2}{C}H=\overset{1}{C}H_2$$

(a) The C_1-C_2 and C_3-C_4 bonds are larger than carbon-carbon double bond
(b) The C_1-C_2 and C_3-C_4 bonds are shorter than carbon-carbon double bond
(c) The C_2-C_3 bond is slightly shorter than C—C bond
(d) The C_2-C_3 bond is slightly larger than C=C bond

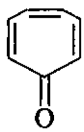
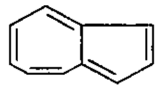
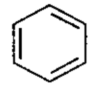
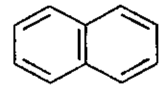
3. Br has low reactivity in $CH_2=CH-Br$ because :

(a) the C—Br bond has a partial double bond character
(b) of the $+M$ effect of bromine
(c) Br is electronegative
(d) None of the above

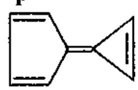
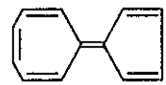
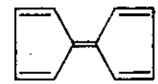
4. Which of the following statements are correct?

(a) $RO^{\ominus}$ is a stronger nucleophile than $^{\ominus}OH$
(b) $RCOO^{\ominus}$ is a stronger nucleophile than $^{\ominus}OH$
(c) $RCOO^{\ominus}$ is a stronger nucleophile than ROH
(d) $RO^{\ominus}$ is weaker nucleophile than $\overset{\ominus}{O}H$

5. Dipole moment of which compound is not zero?

(a)  (b)  (c)  (d) 

6. Which of following compounds can exhibit free rotation?

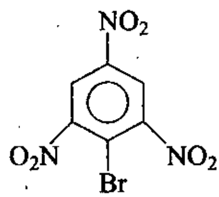
(a)  (b)  (c)  (d) 

7. In which of following pairs the first one is the stronger base than second?

(a) $CH_3COO^{\ominus}, HCOO^{\ominus}$ (b) $\overset{\ominus}{O}H, \overset{\ominus}{N}H_2$

(c) $CH_2{=}\overset{\ominus}{C}H, HC{\equiv}\overset{\ominus}{C}$ (d) CH_3NH_2, CH_3OH

8. Which of the statements are incorrect about the following compound?

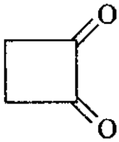
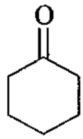


(a) All three C—N bonds are of same length
(b) C_1—N and C_3—N bonds are of same length but shorter than C_5—N bond
(c) C_1—N and C_5—N bonds are of same length but longer than C_3—N bond
(d) C_1—N and C_3—N bonds are of different length but both are longer than C_5—N bond

9. Choose the correct statements :
(a) *O*-hydroxybenzoic acid is much more acidic than *m*-, *p*-isomers and benzoic acid itself
(b) $-M$ or $-R$ group increases acidity of phenol if they are present at *o*-and *p*-position
(c) For resonance to take place structure should be planar
(d) Resonance involve change in the position of atom

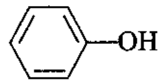
10. Which statements among following are correct?
(a) Hydration effect stabilise dimethyl ammonium ion more than trimethyl ammonium ion
(b) $R{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}NH_2$ is more basic than $R{-}\underset{\underset{\displaystyle O}{\|}}{C}{-}OH$
(c) $\overset{\ominus}{C}H_3 < \overset{\ominus}{N}H_2 < \overset{\ominus}{O}H$ nucleophilicity order in DMSO
(d) Phenol is more acidic than CH_3OH

11. Find out structures which can form stabilised enol structure :

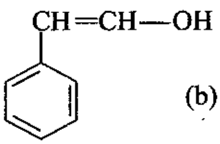
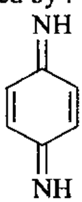
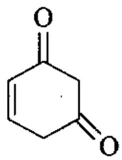
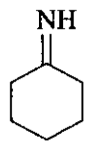
(a)  (b) 

(c) $CH_3-\overset{\overset{O}{\|}}{C}-CH_2-\overset{\overset{O}{\|}}{C}-Ph$ (d) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

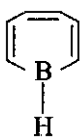
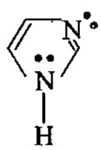
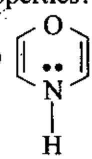
12. Which of the following compounds are more acidic than H_2O ?

(a) CH_3-OH (b) $H-\overset{\overset{O}{\|}}{C}-OH$ (c) $CH_3-\ddot{N}H_2$ (d) 

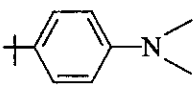
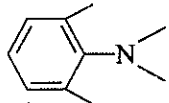
13. Tautomerism is exhibited by :

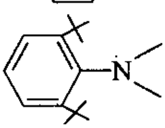
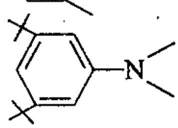
(a)  (b)  (c)  (d) 

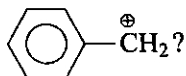
14. Which of the following compounds would exhibit aromatic properties?

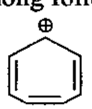
(a)  (b)  (c)  (d) 

15. Which of the following compounds will not show steric inhibition of resonance?

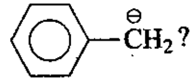
(a)  (b) 

(c)  (d) 

16. Among following cations which are more stabilized than  ?

(a)  (b) $CH_3-\underset{\underset{H}{|}}{\ddot{N}}-\overset{\oplus}{C}H_2$

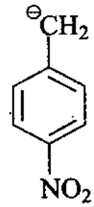
(c) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C^{\oplus}}}$ (d) $CH_2=CH-\overset{\oplus}{C}H_2$

17. Among following anions which are more stable than  ?

(a) $CH_2=CH-\overset{\ominus}{C}H_2$

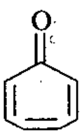
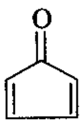
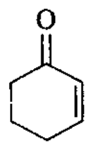
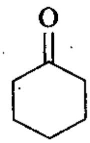
(b) 

(c) $CH_3-\overset{O}{\overset{\|}{C}}-\overset{\ominus}{C}H_2$

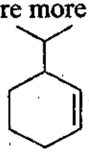
(d) 

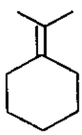
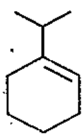
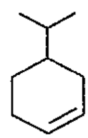
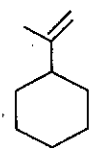
18. Which of the following have larger C—O bond length than C—O bond length of

$CH_3-\overset{O}{\overset{\|}{C}}-CH_3$?

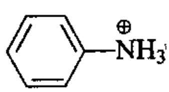
(a) 
(b) 
(c) 
(d) 

19. Which of the following alkenes are more stable than

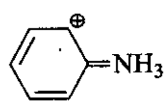
 ?

(a) 
(b) 
(c) 
(d) 

20. Examine the two structures for anilinium ion and choose the correct statement from the ones below :



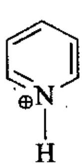
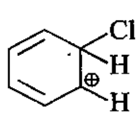
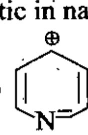
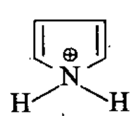
I



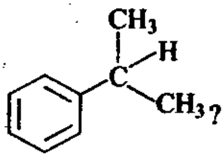
II

(a) II is not an acceptable resonating structure because carbocation is less stable than ammonium ion
(b) II is not acceptable structure because it is non aromatic
(c) II is not acceptable because N has 10 valence electrons
(d) II is not acceptable resonating structure

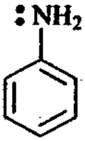
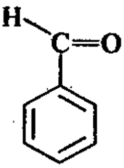
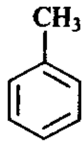
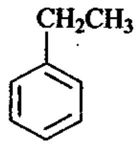
21. Which of the following ions will be aromatic in nature?

(a) 
(b) 
(c) 
(d) 

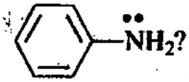
22. Which of the following aromatic rings have greater electron density than



?

(a)  (b)  (c)  (d) 

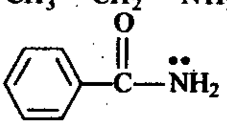
23. Which of the following compounds are more basic than



?

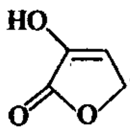
(a) $CH_3-CH_2-\ddot{N}H_2$

(b) $CH_3-\overset{\overset{\large NH}{||}}{C}-NH_2$

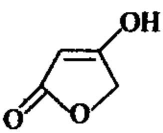
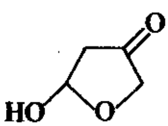
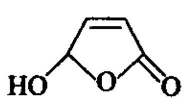
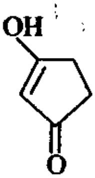
(c) 

(d) $CH_2=CH-\ddot{N}H_2$

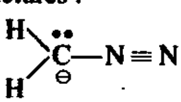
24. Which of the following compounds contain more acidic hydrogen than hydrogen of



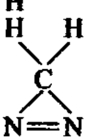
?

(a)  (b)  (c)  (d) 

25. Lewis formula for diazomethane, CH_2N_2 is shown below. Find out incorrect structures :

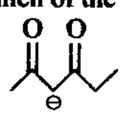
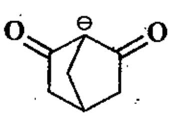
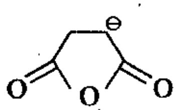
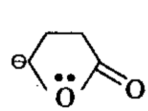
(a) 

(b) $H-C\equiv\overset{\oplus}{N}-\overset{\ominus}{N}-H$

(c) 

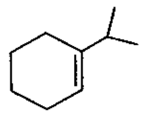
(d) $H-N=C=N-H$

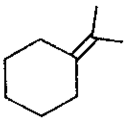
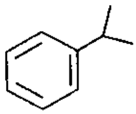
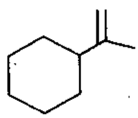
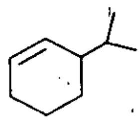
26. Which of the following carbanions are not resonance stabilized?

(a)  (b)  (c)  (d) 

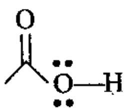
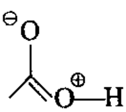
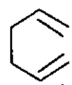
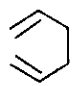
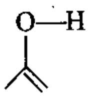
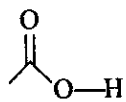
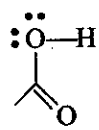
27. Which of the following compounds have planar molecular configuration?
(a) $H_2C=CH_2$
(b) $H_2C=CH—C\equiv C—H$
(c) $H_2C=C=CH_2$
(d) $H_2C=C=C=CH_2$

28. Which of the following alkenes have lower value of heat of hydrogenation than

 ?

(a) 
(b) 
(c) 
(d) 

29. Which of the following structural pairs do not represent contributors to resonance hybrid?

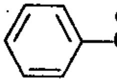
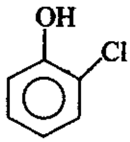
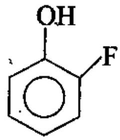
(a)  and 
(b)  and 
(c)  and 
(d)  and 

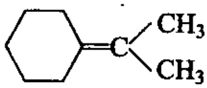
30. Which of the following behave both as a nucleophile and an electrophile?
(a) $CH_3\ddot{N}H_2$
(b) $CH_3—Cl$
(c) $CH_3—C\equiv N$
(d) $CH_3—\overset{\overset{\displaystyle O}{\|}}{C}—H$

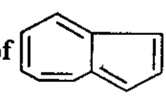
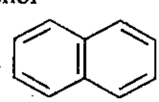
31. Polarisation of electrons in acrolein cannot be written as :
(a) $\overset{\delta-}{C}H_2=CH—\overset{\delta+}{C}=O$
(b) $\overset{\delta-}{C}H_2=CH—CH=\overset{\delta+}{O}$
(c) $\overset{\delta-}{C}H_2=\overset{\delta+}{C}H—CH=O$
(d) $\overset{\delta+}{C}H_2=CH—CH=\overset{\delta-}{O}$

32. Which among the following statements are correct?
(a) $\ddot{C}F_2$ is more stable than $\ddot{C}Cl_2$
(b) $\ddot{C}Cl_2$ is more stable than $\ddot{C}Br_2$
(c) Singlet $\ddot{C}H_2$ is more stable than triplet $\ddot{C}H_2$
(d) Singlet $\ddot{C}H_2$ has planar geometry

33. Which among following statements are correct?
(a) Energy needed for homolytic bond fission is less than that required for the heterolytic bond fission
(b) Homolytic bond fission gives neutral species which is paramagnetic in nature
(c) Homolytic bond fission takes place in non polar solvents
(d) Cation and anion is produced by heterolytic bond fission

34. Which of these statements are correct?
    (a) Stability of alkyl carbanion can be explained by hyperconjugation
    (b)  $\overset{\ominus}{C}H_2$ is more stable than $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{C}H_2$
    (c)  is more acidic than 
    (d) B.pt. of *o*-nitrophenol is less than *p*-nitrophenol

35. Which of these statements are correct?
    (a) Dipole moment of  is greater than $Ph-\overset{\overset{O}{\|}}{C}-Ph$
    (b) Acetone behaves as electrophile as well as nucleophile
    (c)  can show geometrical isomerism
    (d) $RO^{\ominus}$ is better nucleophile than $RS^{\ominus}$

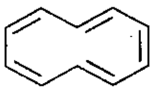
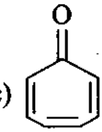
36. Which of these statements are correct?
    (a) 1, 3, 5-cycloheptatriene is not acidic while 1, 3-cyclopentadiene is acidic in nature
    (b) *p*-chlorophenol is less acidic than *p*-fluorophenol
    (c) Dipole moment of  is greater than 
    (d) Mesomeric effect is temporary effect

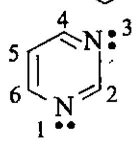
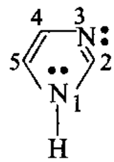
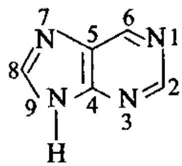
37. Which of the following are nucleophiles?
    (a) $CN^{\ominus}$ (b) BF_3 (c) $R-O-R$ (d) NH_3

38. Which of the following are electrophiles?
    (a) BF_3 (b) $AlCl_3$ (c) $H_3\overset{\oplus}{O}$ (d) $R_4\overset{\oplus}{N}$

39. Which of the following are less basic than $H_2C=\ddot{N}H$?
    (a) $CH_3-C\equiv\ddot{N}$
    (b) 
    (c) $CH_3-\overset{\overset{O}{\|}}{C}-\ddot{N}H_2$
    (d) 

40. Which of the following compounds are not linear?

(a)  (b)  (c)  (d) 

41.   

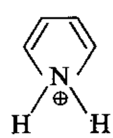
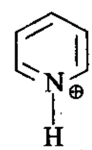
Pyrimidine Imidazole Purine

Among the following which statements are correct?

(a) Both N of pyrimidine are of same basic strength
(b) In imidazole, protonation takes place on N—3
(c) Purine has 3 basic N
(d) Purine, Imidazole and pyrimidine all are aromatic

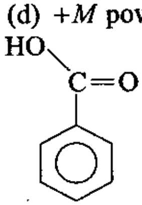
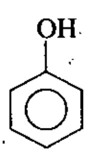
42. Pyridine is more basic than pyrrole. Which of these following statements explain this fact?

(a) In pyrrole lone pair is involved in aromaticity, in pyridine lone pair is not involved in aromaticity it is free for donation
(b) Conjugated acid of pyridine remains aromatic but pyrrole does not remain aromatic.

Non Aromatic Aromatic

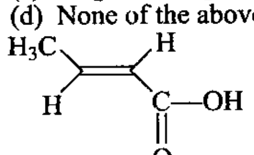
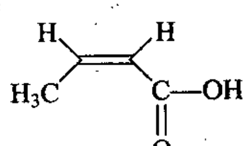
(c) $+I$ power in pyrrole is greater than pyridine
(d) $+M$ power of pyrrole is greater than pyridine

43.  

I II

Among the following which statements are correct?

(a) Conjugate base of (I) is more stable than that of phenol (II)
(b) Conjugate base of (II) is more stable than that of benzoic acid (I)
(c) Magnitude of positive charge on H atom of —OH group is greater in (I) than (II).
(d) None of the above

44.  

(*A*) (*B*)

Which of the following statements are correct about this pair of geometrical isomer?

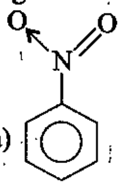
(a) $-I$ effect of vinylic group on the —COOH group is same in both isomers, so there is no role of $-I$ on the strength of acidity

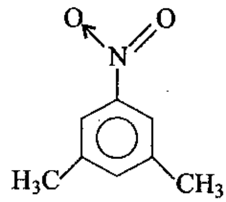
(b) $+M$ power of vinylic group is operating effectively in *trans* isomer (A) but not in *cis*-isomer (B) because of steric repulsion in *cis*-isomer causing loss of coplanarity of —COOH gp. with C=C bond. Therefore, *cis*-isomer is more acidic than *trans*

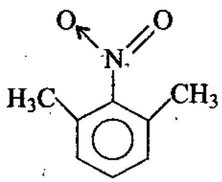
(c) $+I$ power of CH_3— is greater in *trans* than *cis*

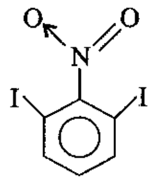
(d) None of the above

45. In which of the following molecules —NO_2 group is not coplanar with phenyl ring?

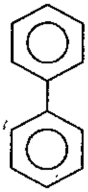
(a) 

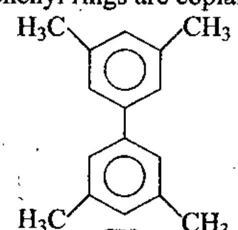
(b) 

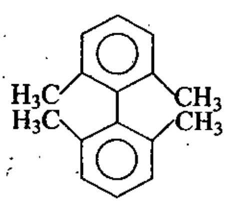
(c) 

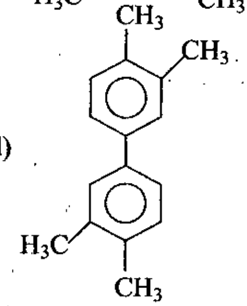
(d) 

46. In which of the following molecules both phenyl rings are coplanar?

(a) 

(b) 

(c) 

(d) 

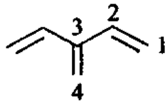
47. Find out correct statements regarding resonance energy :

(a) It is equal to energy of resonance hybrid

(b) It is equal to the difference in energies of the most stable canonical structure and resonance hybrid

(c) It is energy released by the molecule

(d) It is equal to the energy of least stable canonical structure

48. 

Which of the following statements are incorrect about this molecule?

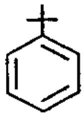
(a) C_1—C_2 and C_3—C_4 bonds are of same length

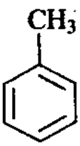
(b) C_1—C_2 bond is shorter than C_3—C_4 bond

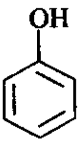
(c) C_1—C_2 bond is longer than C_3—C_4 bond

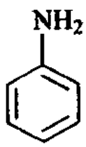
(d) C_1—C_2 and C_2—C_3 bonds are of same length

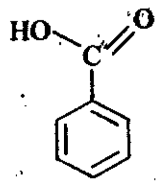
49. Which of the following compounds will create electron at *ortho* and *para* greater than



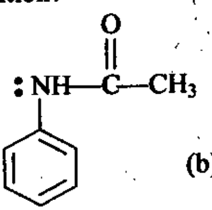
(a) 

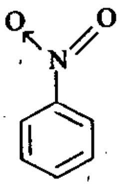
(b) 

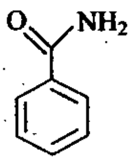
(c) 

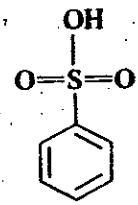
(d) 

50. Which of the following compounds have electron deficiency at *ortho* and *para* position?

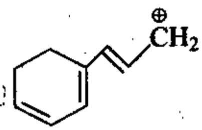
(a) 

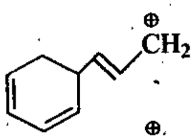
(b) 

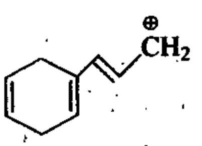
(c) 

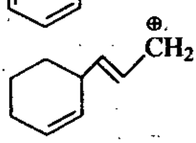
(d) 

51. Identify the cations which are less stable than :



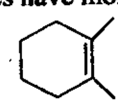
(a) 

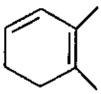
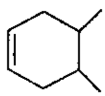
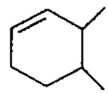
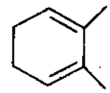
(b) 

(c) 

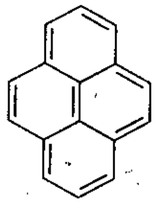
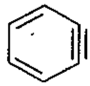
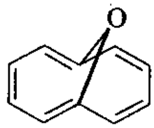
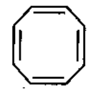
(d) 

52. Which of the following alkenes have more value of heat of hydrogenation than

 ?

(a)  (b)  (c)  (d) 

53. Which of the following compounds exhibit aromatic character?

(a)  (b)  (c)  (d) 

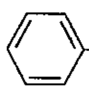
54. Which of the following solvents are aprotic?

(a) $H_3C-\overset{\overset{O}{\|}}{S}-CH_3$ (b) $CH_3-\overset{\overset{O}{\|}}{C}-OH$

(c) $H-\overset{\overset{O}{\|}}{C}-N(CH_3)_2$ (d) $H-S-H$

55. In which cases, free radicals can be formed by homolytic fission?

(a) $H_3C-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{hv}$ (b) $R-N=N-R \xrightarrow{hv}$

(c)  $-CH_2-\overset{\overset{O}{\|}}{C}-\dot{O} \xrightarrow{hv}$ (d) $CH_3-O-O-CH_3 \xrightarrow{hv}$

EXERCISE-3 LINKED COMPREHENSION TYPE

Passage-1

Electron deficient species are known as electrophiles. All positively charged species are not electrophilic. Covalent compounds having complete octet but if central atom has unfilled *d*-orbital also act as electrophiles. All electrophiles are not always lewis acid.

1. Which of the following is not electrophile?

(a) $H^{\oplus}$ (b) $\overset{\oplus}{C}H_3$ (c) BX_3 (d) $\overset{\oplus}{N}H_4$

2. Which of the following electrophile is not lewis acid?

(a) BCl_3 (b) $BeCl_2$ (c) $\dot{C}H_3$ (d) $\underset{\cdot\cdot}{\overset{\cdot\cdot}{C}}H_2$

3. Which of the following is electrophilic in nature?

(a) CO_2 (b) $H_3\ddot{O}^{\oplus}$

(c) CH_4 (d) $\overset{\ominus}{Al}Cl_4$

Passage-2

When (C—H)σ electrons are in conjugation to pi bond, this conjugation is known as hyperconjugation. For any compound to show hyperconjugation :

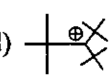
(i) Compound should have one sp^2-hybridised carbon.

(ii) α-carbon with respect to sp^2 should be sp^3

(iii) α-carbon should contain at least one hydrogen atom.

No. of α-carbon $\propto$ stability of cation and alkene.

4. Which of following cations is hyperconjugation destabilized?

(a) $CH_3—\overset{\oplus}{C}H_2$ (b) $CH_3—\overset{\oplus}{C}H—CH_3$ (c) $(CH_3)_3C^{\oplus}$ (d) 

5. Which of following alkenes is most stabilized?

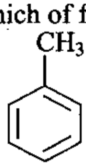
(a) $CH_2{=}CH_2$

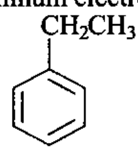
(b) $(CH_3)_2C{=}CH_2$

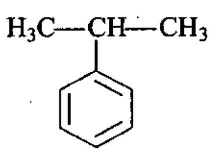
(c) $(CH_3)_2C{=}C(CH_3)_2$

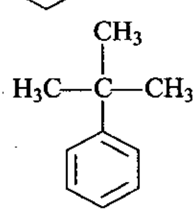
(d) $CH_3—CH{=}C(CH_3)_2$

6. Which of following alkyl benzene has maximum electron density?

(a) 

(b) 

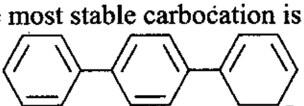
(c) 

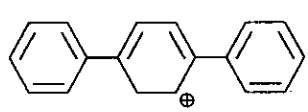
(d) 

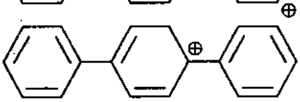
Passage-3

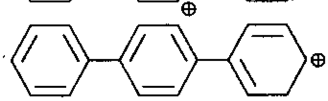
In an aromatic ring, a functional group with lone pair of electron exerts $+M$ effect, some functional groups like, —NO, —NC —CH=CH$_2$ etc., can function both as electron donating ($+M$) or electron withdrawing ($-M$) groups. More extended conjugation provide more stabilization.

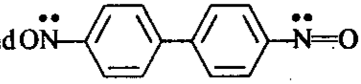
7. The most stable carbocation is :

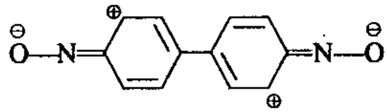
(a) 

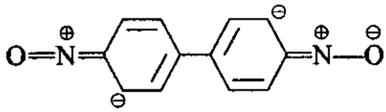
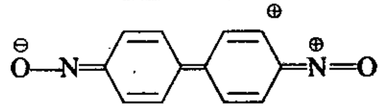
(b) 

(c) 

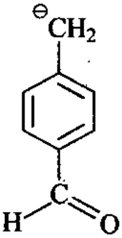
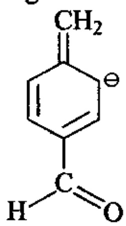
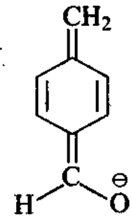
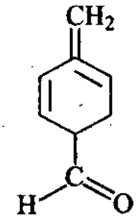
(d) 

8. The most stable resonating structure of compound  is :

(a)  (b) 

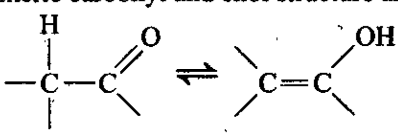
(c)  (d) 

9. The most stable resonating structure is :

(a)  (b)  (c)  (d) 

Passage-4

The process whereby a hydrogen atom attached to the α-carbon of carbonyl compound moves to the carbonyl oxygen atom is known as enolization or keto-enol tautomerism. Isomeric carbonyl and enol structure are tautomers.

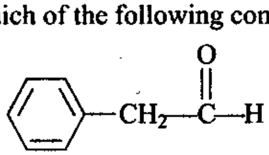
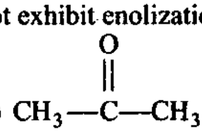


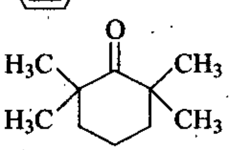
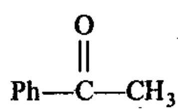
Carbonyl Enol

$$K_T = \frac{[\text{enol}]}{[\text{carbonyl}]}$$

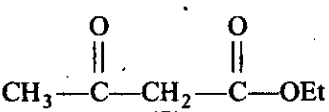
Normally, the carbonyl form is favoured but structural factor marked affect K_T.

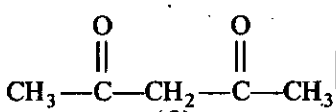
10. Which of the following compounds will not exhibit enolization?

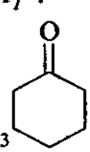
(a)  (b) 

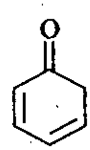
(c)  (d) 

11. Arrange the following compounds in decreasing order of K_T :


(P)

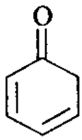
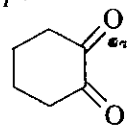

(Q)


(R)


(S)

(a) $P > Q > R > S$ (b) $S > Q > P > R$ (c) $Q > R > P > S$ (d) $S > P > R > Q$

12. Which of the following has least value of K_T?

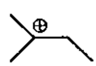
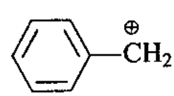
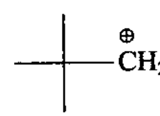
(a) 
(b) 

(c) $CH_3-\overset{O}{\overset{\|}{C}}-\underset{O}{\underset{\|}{C}}-CH_3$
(d) $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-CH_3$

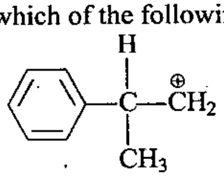
Passage-5

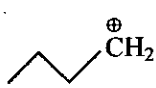
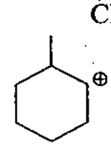
Under common reaction conditions, a carbocation rearranges to another carbocation of equal or greater stability. For example, secondary carbocation will rearrange to a tertiary carbocation. It will not rearrange to a less stable primary carbocation. This generalization is not absolute, and because there is not a high energy barrier to the rearrangement of carbocations, rearrangement to a less stable cation can occur if it offers the chance to form a more stable product.

13. In which of the following cations rearrangement takes place?

(a) 
(b) 
(c) 
(d) 

14. In which of the following cations rearrangement takes place most rapidly?

(a) 
(b) $CH_3-\overset{H}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-\overset{\oplus}{C}H_2$

(c) 
(d) 

15. In the following cation, H/CH_3 that is most likely to migrate to the positively charged carbon is :

$$H_3C^1-\overset{H}{\overset{|}{\underset{OH}{\underset{|}{{}^2C}}}}-\overset{\oplus}{\underset{H}{\underset{|}{{}^3C}}}-\overset{H}{\overset{|}{\underset{CH_3}{\underset{|}{{}^4C}}}}-{}^5CH_3$$

(a) CH_3 at C—4 (b) H at C—4 (c) CH_3 at C—2 (d) H at C—2

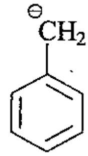
Passage-6

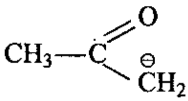
Type of anions in which delocalisation of negative charge occur on more electronegative atom are highly stabilized. If negative charge delocalisation occur on same element then stability is decided by number of resonating structure. Cyclic anions

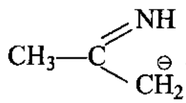
which are aromatic are highly stabilized but if cyclic anions are antiaromatic, they are highly destabilise due to presence of unpaired electrons in antibonding molecular orbital.

16. Which of the following anions is highly stabilized?

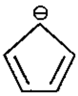
(a) $CH_2{=}CH{-}\overset{\ominus}{C}H_2$

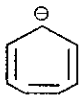
(b) 

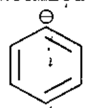
(c) 

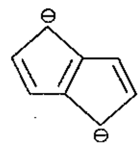
(d) 

17. Which of the following anions is most destabilized?

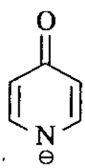
(a) 

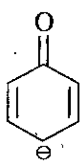
(b) 

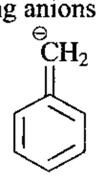
(c) 

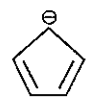
(d) 

18. Find out most stable anion among following anions :

(a) 

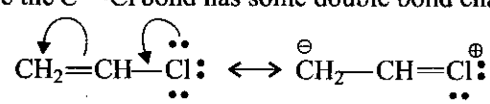
(b) 

(c) 

(d) 

Passage-7

In a substance that are resonance hybrids, the measured length of given bond usually differs from that predicted from any one of the contributing structures. Chloroethylene is found by measurement to have a C—Cl distance of 1.69Å. This is shorter than C—Cl bond in such compounds a methyl chloride (1.77Å), an indication that in chloroethylene the C—Cl bond has some double bond character.

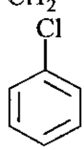


19. Which of the following has shortest C—Cl bond?

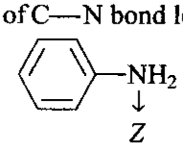
(a) $CH_3{-}Cl$

(b) $CH_2{=}CH{-}Cl$

(c) $CH_2{=}CH{-}CH{=}CH{-}Cl$

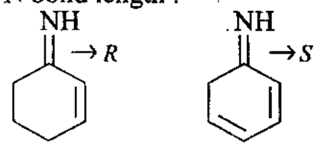
(d) 

20. Arrange the following in decreasing order of C—N bond length :

$\underset{X}{CH_3{-}\ddot{N}H_2}$ $\underset{Y}{CH_2{=}CH{-}\ddot{N}H_2}$ 

(a) $Z > Y > X$ (b) $Y > Z > X$ (c) $X > Y > Z$ (d) $X > Z > Y$

21. Arrange following in increasing order of C—N bond length :

$\underset{\downarrow P}{CH_2{=}\ddot{N}H}$ $\quad$ $CH_3—CH_2 \underset{\downarrow Q}{—} NH_2$ 

(a) $Q<P<R<S$ (b) $P<R<S<Q$
(c) $R<S<Q<P$ (d) $S<R<Q<P$

Passage-8

Basicity is defined by equilibrium constant for abstracting a proton. Nucleophilicity is defined by rate of attack on an electrophilic carbon atom.

Basicity $\quad B^{\ominus} + H—A \overset{Keq}{\rightleftharpoons} B—H + A^{\ominus}$

Nucleophilicity $\quad B^{\ominus} + —\overset{|}{\underset{|}{C}}—X \xrightarrow{K} B—\overset{|}{\underset{|}{C}}— + X^{\ominus}$

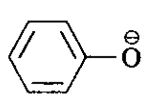
A species with a negative charge is stronger nucleophile than similar neutral species. Nucleophilicity decreases from left to right in periodic table and increases down the group in periodic table. As the size of similar type of negatively charged species increases, basicity increases and nucleophilicity decreases.

22. Which of the following is incorrect order of nucleophilicity?

(a) $\overset{\ominus}{O}H > H_2O$ (b) $Et_3\ddot{P} > Et_2\ddot{S}:$
(c) $I^{\ominus} > Br^{\ominus} > Cl^{\ominus} > F^{\ominus}$ (d) $\overset{\ominus}{O}H > \overset{\ominus}{S}H > \overset{\ominus}{S}eH$

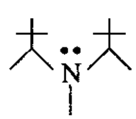
23. Which of the following negatively charged species has maximum basic character?

(a) $CH_3\overset{\ominus}{O}$ (b) $CH_3—\underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}—\overset{\ominus}{O}$

(c) $(CH_3)_2CH—\overset{\ominus}{\ddot{O}}$ (d) 

24. Among the given pairs, in which first has lower nucleophilic character?

(a) $CH_3\overset{\ominus}{S}$ and CH_3OH (b) $CH_3CH_2\overset{\ominus}{O}$ and $CH_3—\overset{CH_3}{\overset{|}{C}H}—\overset{\ominus}{O}$

(c)  and $CH_3—\underset{H}{\underset{|}{\ddot{N}}}—CH_3$ (d) $\ddot{P}H_3$ and $\ddot{N}H_3$

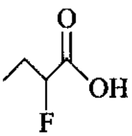
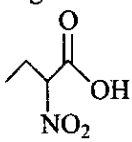
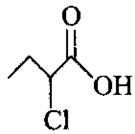
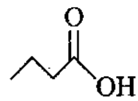
Passage 9

Benzoic acid is more acidic than acetic acid, formic acid is more acidic than benzoic acid, among monosubstituted benzoic acid derivative, the *ortho* derivative is more acidic than *meta* and *para* substituted acid due to *ortho* effect. Acidity of an acid can be explained by the stability of conjugated base of acid.

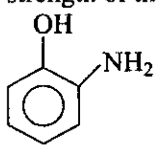
25. Conjugated base of which compound will be most stable?

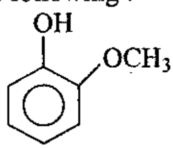
(a) $CH_3CH_2—NO_2$
(b) $CH_3—\overset{\displaystyle NO_2}{\overset{|}{C}H}—CH_3$
(c) $O_2N—CH_2—NO_2$
(d) $NC—CH_2—CN$

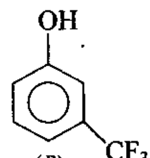
26. Which one of the following is most acidic?

(a) 
(b) 
(c) 
(d) 

27. Compare acidic strength of the following :


(*P*)


(*Q*)


(*R*)

(a) R > *Q* > *P*
(b) *P* > *Q* > *R*
(c) *Q* > *P* > *R*
(d) *P* > *R* > *Q*

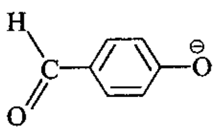
EXERCISE-4 MATRIX MATCH TYPE

1. Column (I) **Column (II)**

(a) $H_3C—\overset{\oplus}{C}H_2$ *P*. Resonance

(b) $H_3C—\overset{\bullet}{C}H_2$ *Q*. Hyperconjugation

(c) $Cl—\overset{\ominus}{\underset{\underset{\displaystyle C}{|}}{C}}—Cl$ *R*. $+I$ effect

(d)  *S*. $-I$ effect

2. Column (I) **Column (II)**

(a) $CH_3—\overset{\oplus}{C}H—CH_3$ *P*. Pyramidal structure

(b) $\overset{\ominus}{C}H_3$ *Q*. Planar geometry

(c) $CH_3—\dot{C}H—CH_3$ — *R.* Electrophile

(d) Singlet carbene — *S.* Nucleophile

3. Column (I) — **Column (II)**

(a) $H_3C—CH{=}CH—\overset{\overset{\large O}{\|}}{C}—H$ — *P.* Resonance

(b) $D—\overset{\oplus}{\underset{\underset{\large D}{|}}{C}}—D$ — *Q.* Hyperconjugation

(c) $F—\overset{\oplus}{\underset{\underset{\large F}{|}}{C}}—F$ — *R.* Inductive effect

(d)  — *S.* Non planar

4. Column (I) — **Column (II)**

(a) CO_2 — *P.* Electrophile

(b) $\overset{\ominus}{N}O_2$ — *Q.* Ambident nucleophile

(c) $CH_3—\overset{\overset{\large O}{\|}}{C}—H$ — *R.* Ambident substrate

(d) $H_3C—CH—CH_2$ (with O bridging CH and CH_2, epoxide) — *S.* Electrophile as well as nucleophile

5. Column (I) — **Column (II)**

Compounds — pK_a values

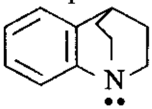
(a) $H_3C—\overset{\overset{\large O}{\|}}{C}—CH_2—\overset{\overset{\large O}{\|}}{C}—OEt$ — *P.* 3.5

(b) $H_3C—\overset{\overset{\large O}{\|}}{C}—CH_2—\overset{\overset{\large O}{\|}}{C}—CH_3$ — *Q.* 10.7

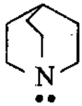
(c) $H—\overset{\overset{\large O}{\|}}{C}—CH_2—\overset{\overset{\large O}{\|}}{C}—H$ — *R.* 8.9

(d) $H—\overset{\overset{\large O}{\|}}{C}—CH_2—\overset{\overset{\large O}{\|}}{N}\rightarrow O$ — *S.* 0.4

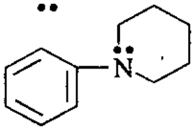
6. Column (I) Compounds | **Column (II)** pK_b values

(a) 

P. 13.60

(b) 

Q. 6.21

(c) 

R. 3.35

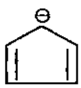
(d) 

S. 8.80

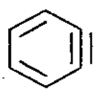
7. Column (I) | **Column (II)**

(a) 

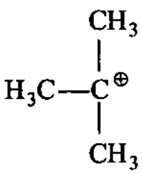
P. Hyperconjugation

(b) 

Q. All carbon atoms are sp^2-hybridized

(c) 

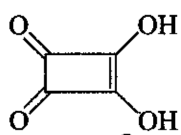
R. Aromatic

(d) 

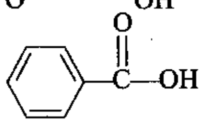
S. Diamagnetic

8. Column (I) | **Column (II)**

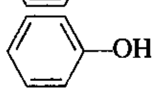
(a) $NaHCO_3$ will react.

P. 

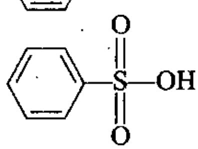
(b) Na will react with.

Q. 

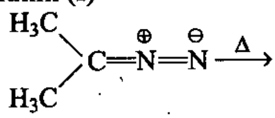
(c) NaOH will react with.

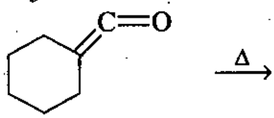
R. 

(d) $NaNH_2$ will react with.

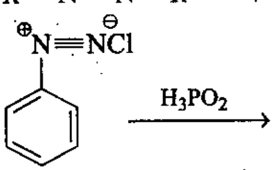
S. 

9. Column (I) **Column (II)**

(a)  P. Free radical is formed

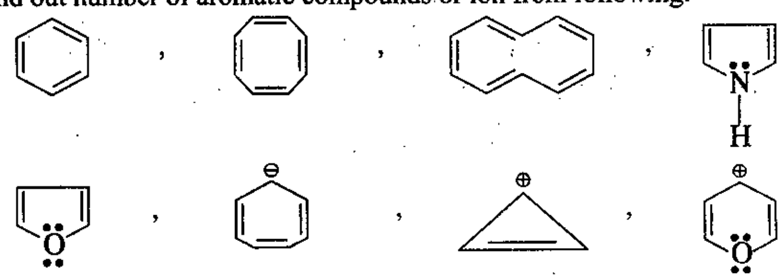
(b)  Q. N_2 will liberated

(c) $R-N=N-R \xrightarrow{\Delta}$ R. Carbene will formed

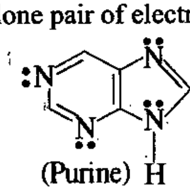
(d)  S. Nucleophilic aromatic substitution reaction

EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

1. Find out number of aromatic compounds or ion from following.



2. The purine hetrocycle occurs mainly in the structure of DNA. Identify number of 'N' atoms having localised lone pair of electron.

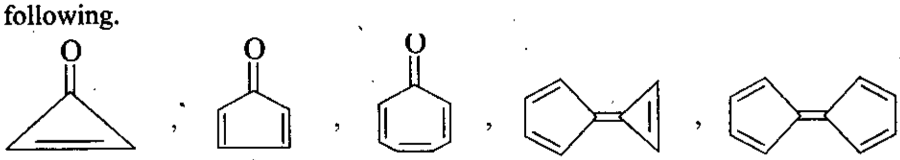


(Purine)

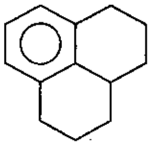
3. How many resonating structures are possible for the compound.

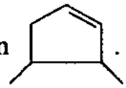
(Furan)

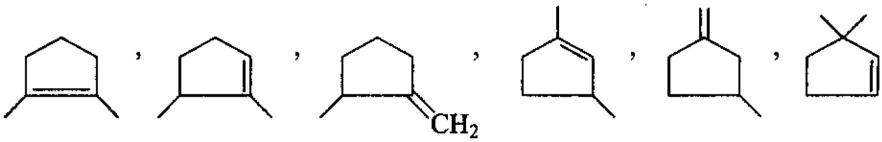
4. Find out number of compounds which are more stabilise in ionic structure, from following.



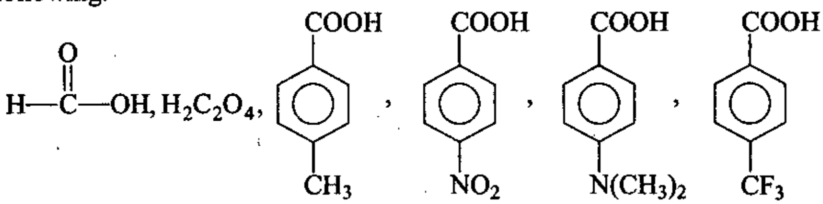
5. Find out number of benzylic hydrogen in



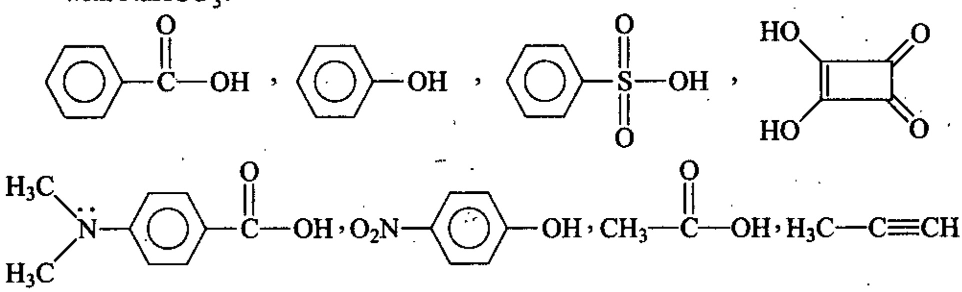
6. How many alkenes, from followings are more stable than .



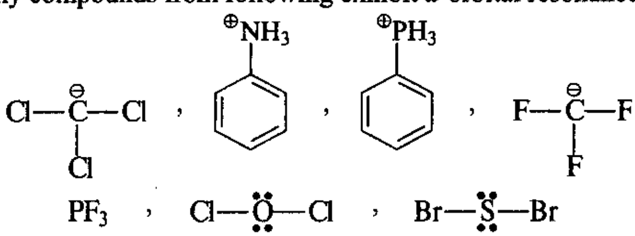
7. Find out number of compounds which are more acidic than benzoic acid, from following.



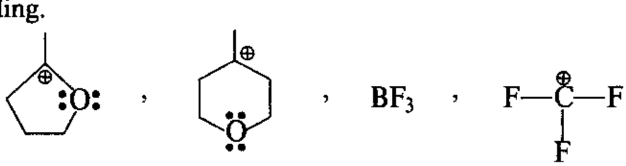
8. Identify number of compound from following. Which liberate CO_2 on reaction with $NaHCO_3$.

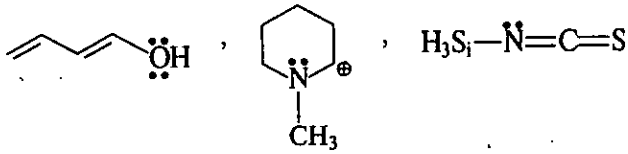


9. How many compounds from following exhibit *d*-orbital resonance.



10. Among the following, find out number of ions or molecules that can show backbonding.





ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (d)	2. (a)	3. (d)	4. (c)	5. (b)	6. (b)	7. (a)	8. (c)	9. (b)	10. (a)
11. (a)	12. (a)	13. (a)	14. (b)	15. (c)	16. (d)	17. (c)	18. (d)	19. (a)	20. (c)
21. (b)	22. (c)	23. (c)	24. (c)	25. (a)	26. (c)	27. (a)	28. (c)	29. (d)	30. (d)
31. (d)	32. (b)	33. (d)	34. (a)	35. (b)	36. (a)	37. (d)	38. (b)	39. (c)	40. (a)
41. (c)	42. (a)	43. (b)	44. (a)	45. (c)	46. (c)	47. (b)	48. (b)	49. (b)	

Level-2

1. (d)	2. (d)	3. (d)	4. (a)	5. (d)	6. (c)	7. (d)	8. (b)	9. (c)	10. (b)
11. (d)	12. (c)	13. (c)	14. (a)	15. (c)	16. (b)	17. (a)	18. (c)	19. (d)	20. (b)
21. (c)	22. (b)	23. (c)	24. (d)	25. (a)	26. (d)	27. (b)	28. (b)	29. (b)	30. (d)
31. (b)	32. (a)	33. (a)	34. (c)	35. (a)	36. (a)	37. (b)	38. (d)	39. (a)	40. (b)
41. (b)	42. (c)	43. (d)	44. (a)	45. (b)	46. (d)	47. (c)	48. (c)	49. (b)	50. (c)
51. (a)	52. (c)	53. (c)	54. (d)	55. (a)	56. (d)	57. (a)	58. (b)	59. (c)	60. (b)
61. (d)	62. (a)	63. (c)	64. (b)	65. (d)	66. (c)	67. (a)	68. (c)	69. (a)	70. (d)
71. (b)	72. (c)	73. (c)	74. (d)	75. (a)	76. (d)	77. (d)	78. (b)	79. (c)	80. (c)
81. (a)	82. (d)	83. (c)	84. (d)	85. (c)	86. (b)	87. (c)	88. (d)	89. (a)	90. (b)
91. (c)	92. (b)	93. (c)	94. (a)	95. (d)	96. (a)	97. (b)	98. (d)	99. (c)	100. (a)
101. (a)	102. (b)	103. (d)	104. (c)	105. (a)	106. (b)	107. (c)	108. (c)	109. (c)	110. (a)
111. (d)	112. (b)	113. (a)	114. (b)	115. (c)	116. (b)	117. (d)	118. (c)	119. (a)	120. (c)
121. (d)	122. (b)	123. (a)	124. (b)	125. (a)	126. (b)	127. (c)	128. (a)	129. (d)	130. (b)
131. (b)	132. (b)	133. (c)	134. (b)	135. (c)	136. (c)	137. (a)	138. (a)	139. (c)	140. (a)
141. (d)	142. (a)	143. (c)	144. (b)	145. (c)	146. (a)	147. (b)	148. (d)	149. (a)	150. (d)
151. (b)	152. (a)	153. (d)	154. (b)	155. (c)	156. (c)	157. (c)	158. (a)	159. (c)	160. (a)
161. (b)	162. (a)	163. (d)	164. (c)	165. (a)	166. (a)	167. (d)	168. (a)	169. (b)	170. (a)
171. (a)	172. (b)	173. (a)	174. (b)	175. (a)	176. (b)	177. (b)	178. (c)	179. (d)	180. (a)
181. (c)	182. (a)	183. (a)	184. (b)	185. (c)	186. (b)	187. (c)	188. (c)	189. (d)	190. (a)
191. (d)	192. (b)	193. (b)	194. (c)	195. (b)	196. (a)	197. (b)	198. (b)	199. (d)	200. (b)
201. (c)	202. (d)	203. (d)	204. (b)	205. (c)					

Exercise-2 : More Than One Correct Answers

1.	(a, b)	2.	(a, c, d)	3.	(a, b)	4.	(a, c)	5.	(a, b)	6.	(b, c)
7.	(a, c, d)	8.	(a, b, d)	9.	(a, b, c)	10.	(a, c, d)	11.	(a, c)	12.	(a, b, d)
13.	(a, c, d)	14.	(a, b, c)	15.	(a, d)	16.	(a, b, c)	17.	(c, d)	18.	(a, c)
19.	(a, b, c, d)	20.	(a, c)	21.	(a, c)	22.	(a, c, d)	23.	(a, b, d)	24.	(a, d)
25.	(b, c, d)	26.	(b, d)	27.	(a, b, d)	28.	(a, b)	29.	(b, c, d)	30.	(c, d)
31.	(a, b, c)	32.	(a, b, d)	33.	(a, b, d)	34.	(b, c, d)	35.	(a, b)	36.	(a, c)
37.	(a, c, d)	38.	(a, b)	39.	(a, b, c)	40.	(a, b)	41.	(a, b, c, d)	42.	(a, b)
43.	(a, c)	44.	(a, b)	45.	(c, d)	46	(a, b, d)	47.	(b, c)	48.	(a, c, d)
49	(a, b, c)	50.	(b, c, d)	51.	(a, b, c)	52.	(b, c)	53.	(a, b, c)	54.	(a, c)
55.	(a, b, c, d)										

Exercise 3 : Linked Comprehension Type

1. (d)	2. (c)	3. (a)	4. (d)	5. (c)	6. (a)	7. (a)	8. (d)	9. (c)	10. (c)
11. (b)	12. (c)	13. (d)	14. (a)	15. (d)	16. (c)	17. (b)	18. (a)	19. (d)	20. (c)
21. (b)	22. (d)	23. (b)	24. (c)	25. (c)	26. (b)	27. (a)			

Exercise-4 : Matrix Match Type

1. (a) $\rightarrow Q, R$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow P, S$;	(d) $\rightarrow P, S$
2. (a) $\rightarrow Q, R$;	(b) $\rightarrow P, S$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow Q, R$
3. (a) $\rightarrow P, Q, R$;	(b) $\rightarrow R$;	(c) $\rightarrow P, R$;	(d) $\rightarrow S$
4. (a) $\rightarrow P$;	(b) $\rightarrow Q$;	(c) $\rightarrow S$;	(d) $\rightarrow R$
5. (a) $\rightarrow Q$;	(b) $\rightarrow R$;	(c) $\rightarrow S$;	(d) $\rightarrow P$
6. (a) $\rightarrow Q$;	(b) $\rightarrow R$;	(c) $\rightarrow S$;	(d) $\rightarrow P$
7. (a) $\rightarrow Q, R, S$;	(b) $\rightarrow Q, R, S$;	(c) $\rightarrow Q, R, S$;	(d) $\rightarrow P, S$
8. (a) $\rightarrow P, Q, S$;	(b) $\rightarrow P, Q, R, S$;	(c) $\rightarrow P, Q, R, S$;	(d) $\rightarrow P, Q, R, S$
9. (a) $\rightarrow Q, R$;	(b) $\rightarrow R$;	(c) $\rightarrow P, Q$;	(d) $\rightarrow Q, S$

Exercise-5 : Integer Answer Type Problems

1. (5)	2. (3)	3. (5)	4. (3)	5. (5)	6. (4)	7. (4)	8. (5)	9. (4)	10. (5)

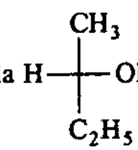
□□□

2 Isomerism

EXERCISE-1 ONLY ONE CORRECT ANSWER

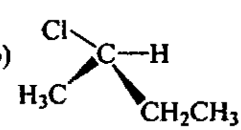
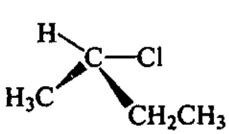
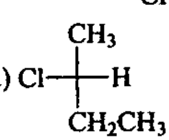
LEVEL-1

1. Which of the following compounds is optically active ?
   (a) 1-Bromobutane (b) 2-Bromobutane
   (c) 1-Bromo-2-methylpropane (d) 2-Bromo-2-methylpropane

2. Which of the following operations on the Fischer formula  does not change its absolute configuration ?
   (a) Exchanging groups across the horizontal bond
   (b) Exchanging groups across the vertical bond
   (c) Exchanging groups across the horizontal bond and also across the vertical bond
   (d) Exchanging a vertical and horizontal group

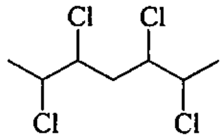
3. Which of the following compound shows optical isomerism ?
   (a) $CH_3CH_2CH_3$ (b) $CH_2OHCHOHCH_2OH$
   (c) $CH_3CHOHC_2H_5$ (d) CCl_2F_2

4. Total number of stereoisomers of the compound 2, 4-dichloroheptane are :
   (a) 2 (b) 3 (c) 4 (d) 6

5. The structure of (S) - 2 - chlorobutane is best represented by :
   (a) $CH_3\overset{\overset{\displaystyle Cl}{|}}{C}HCH_2CH_3$
   (b) 
   (c) 
   (d) 

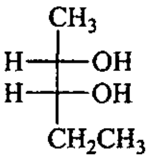
6. Which one of the following is chiral ?
   (a) 1, 1-Dibromo-1-chloropropane (b) 1, 3-Dibromo-1-chloropropane
   (c) 1, 1-Dibromo-3-chloropropane (d) 1, 3-Dibromo-2-chloropropane

7. What is the maximum number of stereoisomers that could exist for the compound below ?

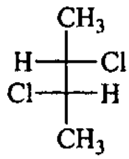


(a) 6 (b) 8 (c) 10 (d) 16

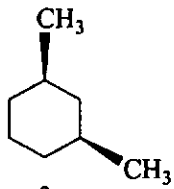
8. Which of the following compound are *meso* forms ?



1



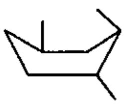
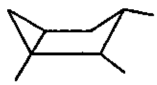
2



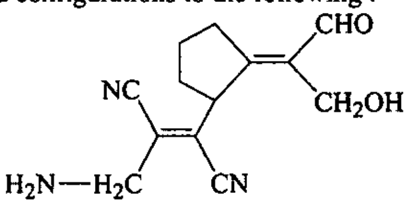
3

(a) 1 only (b) 3 only (c) 1 and 2 (d) 2 and 3

9. Among the structures shown below, which has the lowest potential energy ?

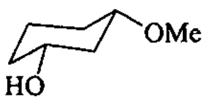
(a)  (b)  (c)  (d) 

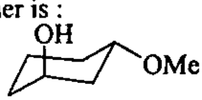
10. Assign double bond configurations to the following :

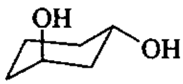


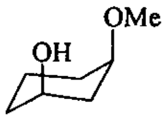
(a) E (b) Z (c) E, E (d) Z, Z

11. Among the following, the most stable isomer is :

(a) 

(b) 

(c) 

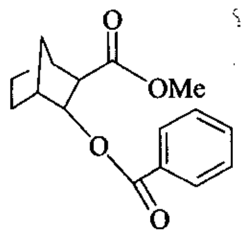
(d) 

12. Which of the following molecules have non-zero dipole moments ?
(I) Gauche conformation of 1, 2-dibromoethane
(II) Anti conformation of 1, 2-dibromoethane
(III) *Trans*-1, 4-dibromocyclohexane
(IV) *Cis*-1, 4-dibromocyclohexane
(V) Tetrabromomethane
(VI) Dibromocyclohexane

(a) I and II (b) I and IV (c) II and IV (d) I, IV and VI

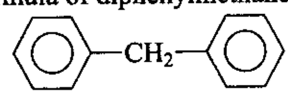
13. An aqueous solution containing compounds A and B shows optical activity. A and B are stereoisomers. Which of the following possibilities cannot be correct ?
   (a) A has two centers, but B does not have any because it has a symmetry plane.
   (b) A and B are enatiomers.
   (c) A and B are distereomers.
   (d) A and B are not present in equal amounts.

14. How many stereogenic centres does it contain ?



   (a) 1 (b) 2 (c) 3 (d) 4

15. The molecular formula of diphenylmethane,


is $C_{13}H_{12}$;

   How many structural isomers are possible when one of the hydrogen in replaced by a chlorine atom ?
   (a) 6 (b) 4 (c) 8 (d) 7

16. Which is the correct structure of D-glyceraldehyde ?

(a)
```
    CHO
H ──┼── OH
    CH2OH
```

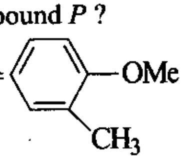
(b)
```
      H
HO ──┼── CHO
      CH2OH
```

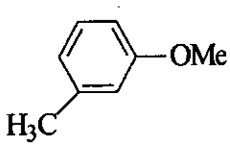
(c)
```
     CH2OH
HO ──┼── H
     CHO
```

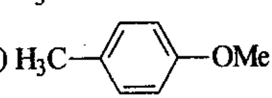
(d) All

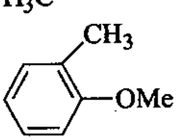
17. Total number of isomers for the molecule, C_3H_6DCl is :
   (a) 3 (b) 4 (c) 6 (d) 8

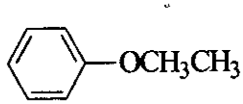
18. Which is the metamer of the compound P ?

P = 

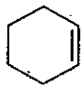
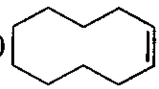
(a) 

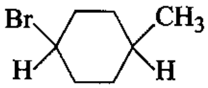
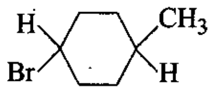
(b) 

(c) 

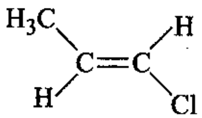
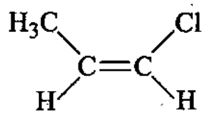
(d) 

19. If degree of unsaturation is three, then a compound shows :
 (a) one triple bond and one double bond
 (b) one double bond and two rings
 (c) one ring and two double bonds
 (d) all of these are correct

20. Geometrical isomerism is possible in :
 (a)  (b)  (c)  (d) 

21.  and  are
 (a) Identical (b) Diasteromers (c) Conformers (d) Homologs

22. Which of the following is correct set of physical properties of the geometrical isomers ?

 and 

I II

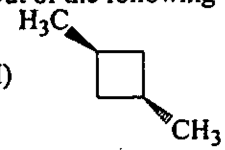
Dipole	Boiling point	Melting point	Stability
(a) I > II	I > II	II > I	I > II
(b) II > I	II > I	II > I	II > I
(c) I > II	I > II	I > II	I > II
(d) II > I	II > I	I > II	I > II

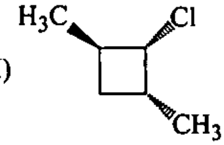
23. Which of the following statements is true ?
 (a) A mixture of enantiomers can be separated on the basis of difference in their boiling points (by a method called fractional distillation).
 (b) A mixture of enantiomers can be separated on the basis of difference in their solubility in any solvent
 (c) A mixture of enantiomers can be separated by converting them into diastereomers by reacting them with an optically active reagent
 (d) A mixture of enantiomers can be separated by passing plane polarised through their solution

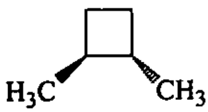
24. Compound  is projection formula of :
 (a) Cyclohexane (b) Cyclopentane (c) Cyclobutane (d) Cyclopropane

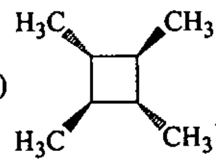
25. Which of the following compounds may not exist as enantiomers ?
 (a) $CH_3CH(OH)CO_2H$ (b) $CH_3CH_2CH(CH_3)CH_2OH$
 (c) $C_6H_5CH_2CH_3$ (c) $C_6H_5CHClCH_3$

26. Out of the following which are chiral ?

(I) 

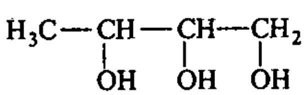
(II) 

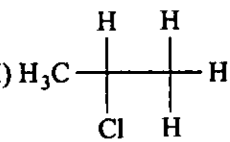
(III) 

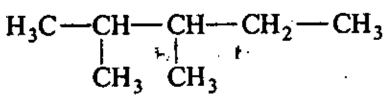
(IV) 

(a) I, II, III (b) I, III, IV (c) II, III (d) II, III, IV

27. Identify number of chiral carbons in the following compounds.

(I) 

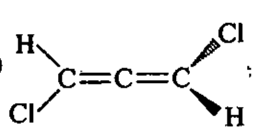
(II) 

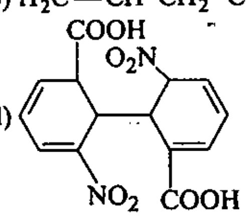
(III) 

(a) 1, 2, 1 (b) 1, 1, 2 (c) 2, 0, 1 (d) 2, 1, 1

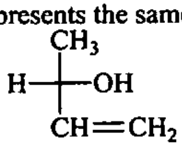
28. Which of the following compounds are optically active ?

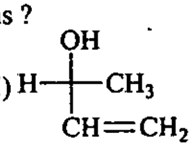
(a) $CH_3 \cdot CHOH \cdot CH_2 \cdot CH_3$ (b) $H_2C{=}CH \cdot CH_2 \cdot CH{=}CH_2$

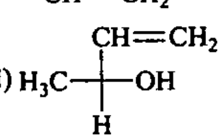
(c) 

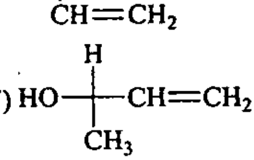
(d) 

29. Which of the following combinations amongst the four Fischer projections represents the same absolute configurations ?

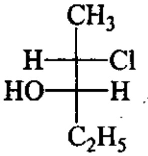
(I) 

(II) 

(III) 

(IV) 

(a) II and III (b) I and III (c) II and IV (d) III and IV

30. 

The compound with the above configuration is called :

(a) (2S, 3S)-2-chloro-3-hydroxypentane

(b) (2S, 3R)-2-chloro-3-hydroxypentane

(c) (2R, 3R)-2-chloro-3-hydroxypentane

(d) (2R, 3S)-2-chloro-3-hydroxypentane

31. Select the correct statements.

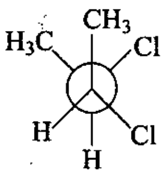
(a) Eclipsed and staggered ethanes give different products on reaction with chlorine in presence of light.

(b) The conformational isomers can be isolated at room temperature.

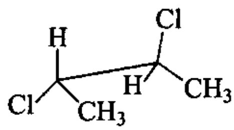
(c) Torsional strain in ethane is minimum at dihedral angles 60°, 180° and 300°.

(d) Steric strain is minimum in staggered gauche form of n - butane.

32. Which of the following statements regarding the projections shown below is true ?



(*A*)



(*B*)

(a) '*A*' and '*B*' both represent the same configuration

(b) Both '*A*' and '*B*' are optically active

(c) '*B*' alone is optically active

(d) '*A*' alone is optically active

33. The Newman projection formula of most stable conformation of 3-Hydroxypropanal is gauche. It is stable due to :

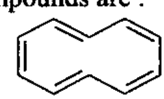
(a) minimum torsional strain

(b) intramolecular hydrogen bonding

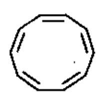
(c) minimum torsional strain and intramolecular hydrogen bonding

(d) minimum steric strain

34. The following two compounds are :



I



II

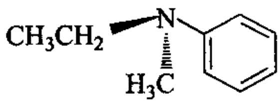
(a) identical

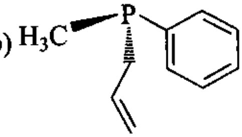
(b) conformational isomers

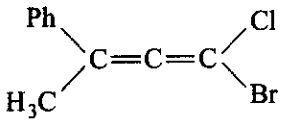
(c) geometrical isomers

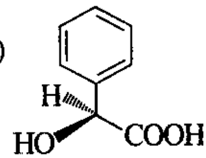
(d) structural isomers

35. Among the following, the optically inactive compound is :

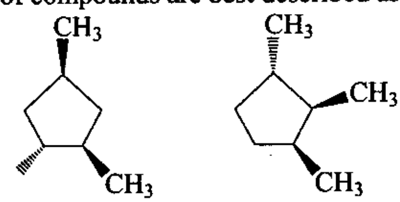
(a) 

(b) 

(c) 

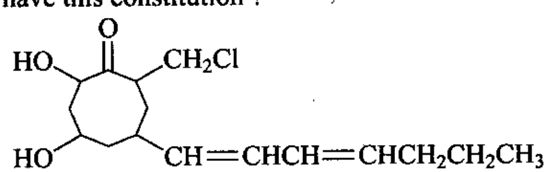
(d) 

36. The following pair of compounds are best described as



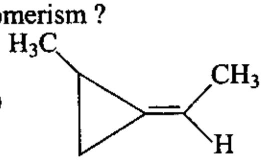
(a) identical
(b) diastereomers
(c) enantiomers
(d) none of these

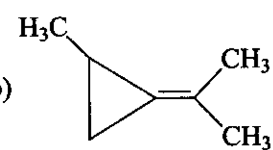
37. A natural occurring substance has the constitution shown below. How many isomers may have this constitution ?

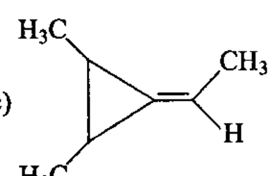


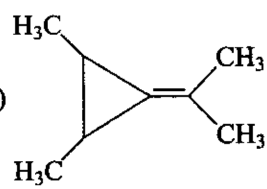
(a) 2 (b) 8 (c) 16 (d) 64

38. Which of the following will not show optical isomerism as well as geometrical isomerism ?

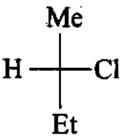
(a) 

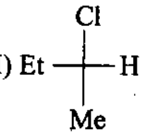
(b) 

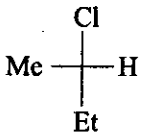
(c) 

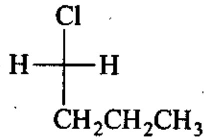
(d) 

39. Which of the following have the same value of optical rotation ?

(I) 

(II) 

(III) 

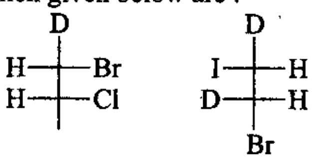
(II) 

(a) I, IV (b) I, II (c) III, IV (d) I, III

40. The correct decreasing priority of ligands $—NO_2$, $—C{\equiv}N$, NH_2 and $—CH_2NH_2$ in absolute configuration of an enantiomer is :

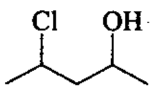
(a) $NO_2 > NH_2 > C{\equiv}N > CH_2NH_2$ (b) $NO_2 > C{\equiv}N > NH_2 > CH_2NH_2$
(c) $NH_2 > NO_2 > C{\equiv}N > CH_2NH_2$ (d) $NH_2 > NO_2 > CH_2NH_2 > C{\equiv}N$

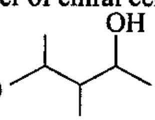
41. The two compounds which given below are :

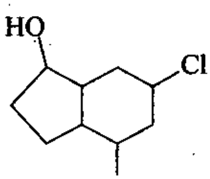


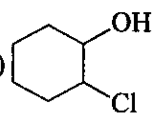
(a) enantiomers (b) identical
(c) optically inactive (d) diastereomers

42. The compound which has maximum number of chiral centres is :

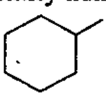
(a) 

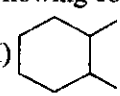
(b) 

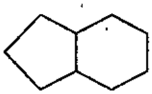
(c) 

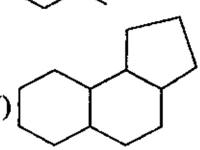
(d) 

43. Identify number of chiral carbons in the following compounds.

(I) 

(II) 

(III) 

(IV) 

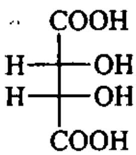
(a) 0, 2, 2, 4 (b) 2, 2, 0, 4 (c) 1, 2, 2, 4 (d) 2, 2, 2, 4

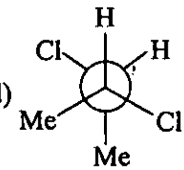
44. Which of the following statements is/are correct ?

(a) A *meso* compound has chiral centres but exhibits no optical activity
(b) A *meso* compound has no chiral centres and thus are optically inactive

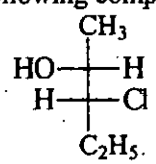
(c) A *meso* compound has molecules which are superimposable on their mirror images even though they contain chiral centres.
(d) A *meso* compound is optically inactive because the rotation caused by any molecule is cancelled by an equal and opposite rotation caused by another molecule that is the mirror image of the first.

45. Which of the following will not show optical isomerism ?
(a) Cl—CH=C=CH—Cl (b) Br—CH=C=CH—Br

(c) 

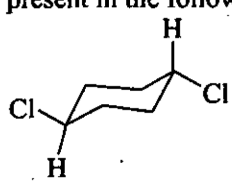
(d) 

46. What is the full name of the following compound ?

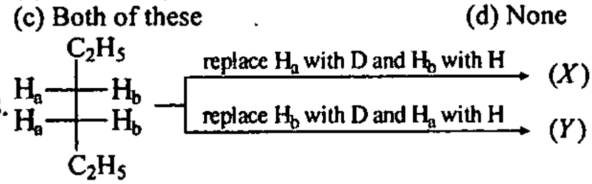


(a) (2*R*,3*R*)—3—chloro—2—pentanol
(b) (2*R*,3*S*)—3—chloro—2—pentanol
(c) (2*S*,3*R*)—3—chloro—2—pentanol
(d) (2*S*,3*S*)—3—chloro—2—pentanol

47. Which type of symmetry is present in the following molecule ?

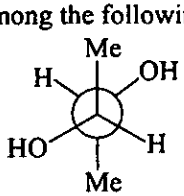


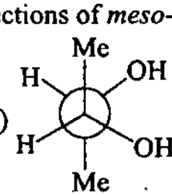
(a) Plane of symmetry (b) Centre of symmetry
(c) Both of these (d) None

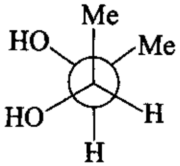
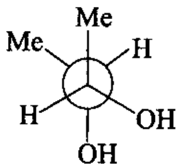
48. 

Relation between (*X*) and (*Y*) is :
(a) enantiomers (b) distereomers
(c) E and Z isomer (d) constitutional isomer

49. Among the following, the Newmann projections of *meso*-2, 3-butanediol are :

(a) 

(b) 

(c) 
(d) 

(a) P, Q (b) P, R (c) R, S (d) Q, S

50. Which of the following compounds is most stable ?

(a)  (b)  (c)  (d) 

LEVEL-2

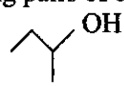
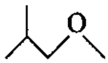
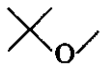
1. Compounds having the same number of atoms of the same elements but differ only in the arrangement of the atoms are called :
(a) isobars (b) isosters (c) homomers (d) isomers

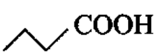
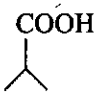
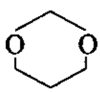
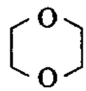
2. How many alkenes are possible with molecular formula C_4H_8?
(a) 2 (b) 3 (c) 4 (d) 6

3. Total number of isomers having molecular formula C_4H_8 :
(a) 2 (b) 3 (c) 4 (d) 6

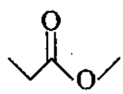
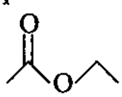
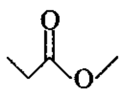
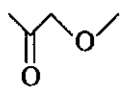
4. The number of isomers possible with molecular formula $C_2H_4Cl_2$ is :
(a) 2 (b) 3 (c) 4 (d) 6

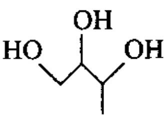
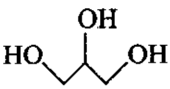
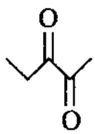
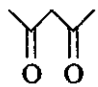
5. Which of the following pairs of compounds are not position isomers?

(a)  and  (b)  and 

(c)  and  (d)  and 

6. Which of the following pairs of compounds are functional isomers?

(a)  and  (b)  and 

(c)  and  (d)  and 

7. Which of the following compounds is isomeric with methyl vinyl ether?
(a) Propanal (b) 1-propanol
(c) Ethyl methyl ether (d) Ether

8. 2-butyne and 1, 3-butadiene are :
(a) chain isomer (b) position isomer
(c) functional isomer (d) tautomers

9. Compound which is not isomeric with diethyl ether is :
   (a) methyl-*n*-propyl ether (b) 1-butanol
   (c) 2-methyl-2-propanol (d) butanone

10. Which of the following pairs of compounds may be regarded both as functional isomer and position isomer?
   (a) Benzyl alcohol and methoxy benzene
   (b) *o*-cresol and *p*-cresol
   (c) Benzyl alcohol and *o*-cresol
   (d) Benzyl alcohol and benzyl methyl ether

11. Which of the following compounds can exhibit enantiomerism?
   (a) 3-hydroxy propanoic acid (b) 3-hydroxy butanoic acid
   (c) 4-hydroxy butanoic acid (d) none of these

12. The functional isomers of ethers are :
   (a) ketone (b) aldehyde
   (c) alcohols (d) esters

13. Which of the following conformations of *n*-butane is least stable?
   (a) Gauche (b) Anti (c) Eclipsed (d) Fully eclipsed

14. Total number of conformation of ethane is :
   (a) 2 (b) 3 (c) 4 (d) Infinite

15. Which of the following conformations of butane is most stable?
   (a) Skew (b) Anti (c) Gauche (d) Eclipsed

16. Maleic acid and fumaric acid are :
   (a) position isomer (b) geometrical isomer
   (c) enantiomers (d) functional isomer

17. Which of the following is a chiral molecule?
   (a) 1-chloro propane (b) 2-chloro propane
   (c) 1-chloro butane (d) 2-chloro butane

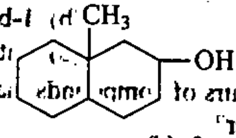
18. Which of the following molecules has a meso stereoisomer?
   (a) $CH_3-\overset{\overset{Cl}{|}}{CH}-CH_2-\overset{\overset{Br}{|}}{CH}-CH_3$
   (b) *trans*-2-hexene
   (c) $CH_3-\underset{\underset{Cl}{|}}{CH}-CH_2-CH_2-CH_2-Cl$
   (d) $CH_3CH_2\underset{\underset{Cl}{|}}{CH}-\underset{\underset{Cl}{|}}{CH}-CH_2CH_3$

19. The number of meso form of the given compound is :

$$CH_3-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{CH}-CH_3$$

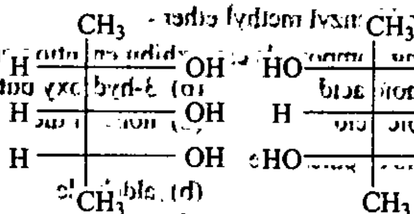
   (a) 2 (b) 3 (c) 4 (d) 8

20. Number of stereo center and stereoisomer of the given compound :



(a) 1 and 2
(b) 2 and 4
(c) 3 and 8
(d) 3 and 6

21. Find out relation between I and II :



(I) (II)

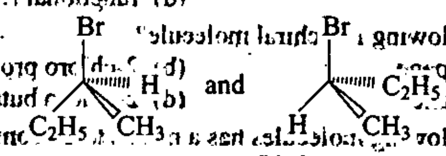
(a) enantiomers
(b) diastereomers
(c) homomers
(d) structural isomers

22. Total number of stereoisomer of given compound will be :

$$CH_3-\underset{\substack{|\\Cl}}{CH}-\underset{\substack{|\\Cl}}{CH}-\underset{\substack{|\\Cl}}{CH}-CH_3$$

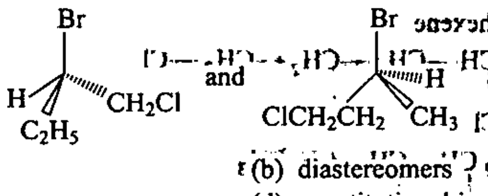
(a) 2
(b) 4
(c) 6
(d) 8

23. The given pair is :



(a) enantiomers
(b) homomers
(c) constitutional isomer
(d) diastereomers

24. The given pair are :



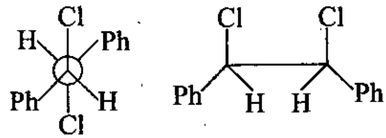
(a) enantiomers
(b) diastereomers
(c) homomers
(d) constitutional isomer

25. Number of stereoisomers of the given compound

$$CH_3-CH=CH-\overset{\substack{OH\\|}}{CH}-CH_3 \text{ is :}$$

(a) 2
(b) 4
(c) 3
(d) 6

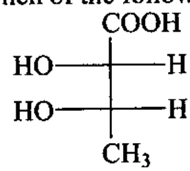
26. Which one of the following statements regarding the projection shown below is correct?

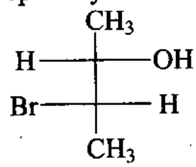


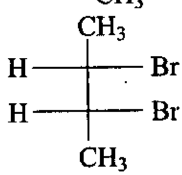
I II

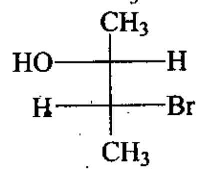
(a) Both the projections represent the same configuration
(b) Both (I) and (II) are optically active
(c) Only (I) is optically active
(d) Only (II) is optically active

27. Which of the following is erythro form and optically inactive?

(a) 

(b) 

(c) 

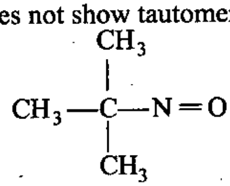
(d) 

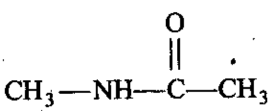
28. Which of the following would exhibit *cis-trans* isomerism?

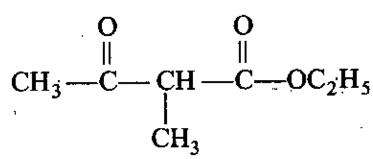
(a) $CH_3CH_2CH{=}CH_2$
(b) $ClCH{=}CHCl$
(c) $ClCH{=}CCl_2$
(d) $CH_2{=}CH{-}COOH$

29. Which one of the following compounds does not show tautomerism?

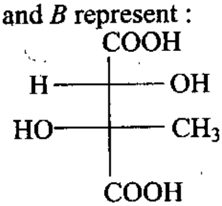
(a) $CH_3CH_2NO_2$

(b) 

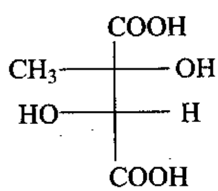
(c) 

(d) 

30. The structures *A* and *B* represent :



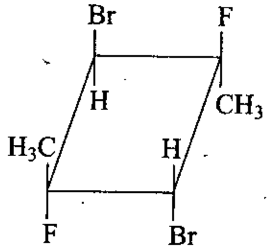
(*A*)



(*B*)

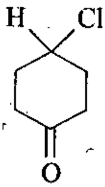
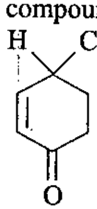
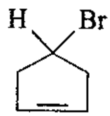
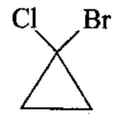
(a) enantiomers
(b) diastereomers
(c) homomers
(d) racemic mixture

31. The compound has :



(a) plane of symmetry
(b) axis of symmetry
(c) center of symmetry
(d) no symmetry

32. Which of the following compounds is chiral?

(a) 
(b) 
(c) 
(d) 

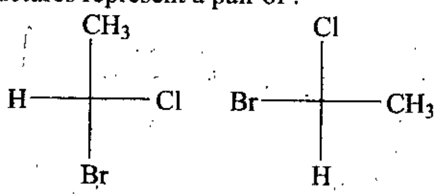
33. Which of the following dienes is chiral?

(a) $CH_3—CH=C=CH_2$
(b) $CH_3—CH=CH—CH=CH_2$
(c) $CH_3—CH=C=CH—CH_3$
(d) $CH_2=CH—CH_2—CH=CH_2$

34. The simplest alcohol that can exhibit enantiomerism :

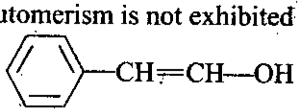
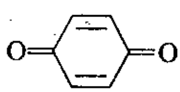
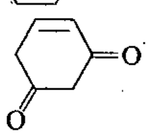
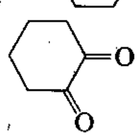
(a) 1-propanol (b) 2-butanol (c) 2-propanol (d) 1-butanol

35. The following structures represent a pair of :

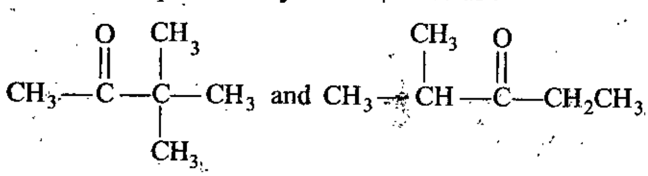


(a) enantiomers
(b) diastereomers
(c) meso compound
(d) homomers

36. Tautomerism is not exhibited by :

(a) 
(b) 
(c) 
(d) 

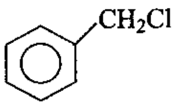
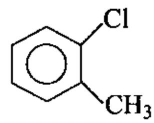
37. The two compounds may be considered as :

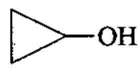


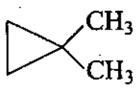
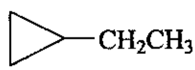
(a) position isomer
(b) chain isomer
(c) stereoisomer
(d) tautomer

38. Which of the following pairs of compounds is a ring-chain isomer?

(a) $CH_3-CH(OH)-CH(OH)-CH_3$ and 

(b)  and 

(c) $CH_2=CH-CH_2-OH$ and 

(d)  and 

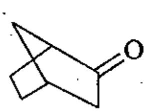
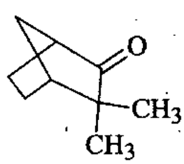
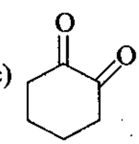
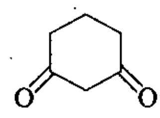
39. The most stable enolic form of 2, 4-pentanedione is :

(a) $CH_2=CH(OH)-CH_2-C(=O)-CH_3$
(b) $CH_3-C(OH)=CH-C(=O)-CH_3$
(c) $CH_2=C(OH)-C(OH)=CH_2$
(d) $CH_3-C(OH)=C=C(OH)-CH_3$

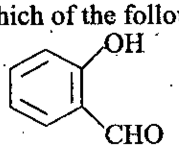
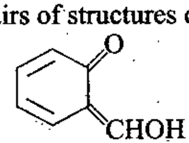
40. Which of the following compounds can exhibit tautomerism?

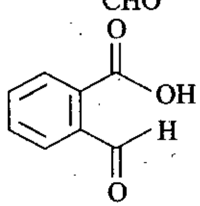
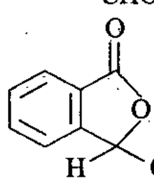
(a) C_6H_5CHO
(b) $C_6H_5-C(=O)-CMe_3$
(c) $C_6H_5-C(=O)-CH_2-C(=O)-H$
(d) $C_6H_5-C(=O)-C_6H_5$

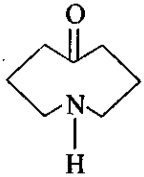
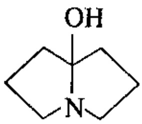
41. Among the following compounds, the one which will not show keto-enol tautomerism is :

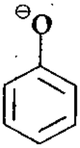
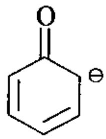
(a) 
(b) 
(c) 
(d) 

42. Which of the following pairs of structures does not represent tautomers?

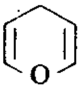
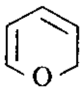
(a)  and 

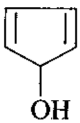
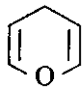
(b)  and 

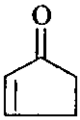
(c)  and 

(d)  and 

43. Which of the following pairs of structures does not represent isomers?

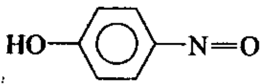
(a)  and 

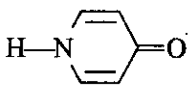
(b)  and 

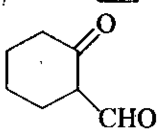
(c)  and 

(d)  and 

44. The compound which may exhibit tautomerism :

(a) 

(b) 

(c) 

(d) All of these

45. Which of the following compounds will show geometrical isomerism?

(a) 2-pentyne
(b) 2-pentene
(c) 2-methyl propene
(d) 2-methyl-2-butene

46. Geometrical isomers are possible for :

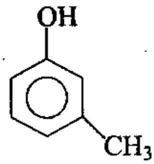
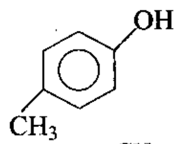
(a) $CH_3CH_2-\underset{\underset{NOH}{\|}}{C}-CH_2CH_3$
(b) $CH_3CH_2-\underset{\underset{O}{\|}}{C}-CH_3$
(c) $CH_3CH_2-\underset{\underset{NOH}{\|}}{C}-CH_3$
(d) $C_6H_5-\underset{\underset{O}{\|}}{C}-C_6H_5$

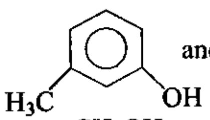
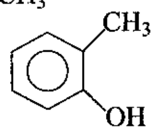
47. Among the following compounds, the one which does not show geometrical isomerism is :

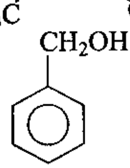
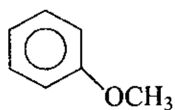
(a) $C_6H_5N=NC_6H_5$
(b) $C_6H_5CH=CHC_6H_5$
(c) $C_6H_5-\underset{\underset{CH_3}{|}}{C}=N-OH$
(d) $C_6H_5-\underset{\underset{C_6H_5}{|}}{C}=N-CH_3$

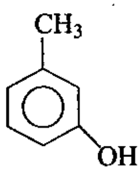
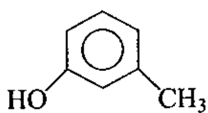
48. The number of alkynes possible with molecular formula C_5H_8 is :
    (a) 2 (b) 3 (c) 4 (d) 5

49. Which of the following pairs of compounds are not isomers?

(a)  and 

(b)  and 

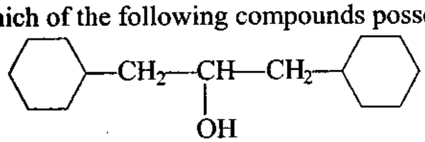
(c)  and 

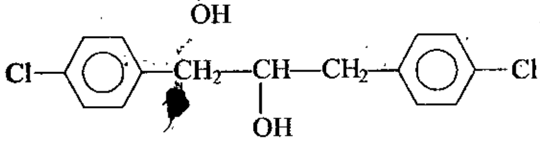
(d)  and 

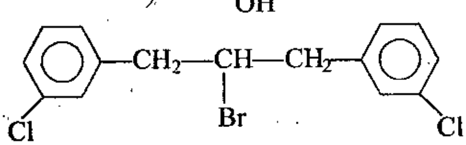
50. The total number of benzene derivatives with molecular formula $C_6H_3Cl_3$ is :
    (a) 2 (b) 3 (c) 4 (d) 5

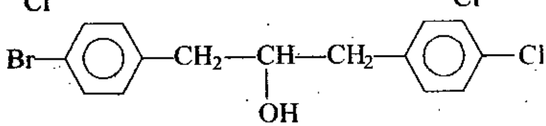
51. A molecule is said to be chiral, only if :
    (a) it is superimposable on its mirror image
    (b) it is non superimposable on its mirror image
    (c) it possesses stereogenic centers
    (d) it can have different configuration

52. Which of the following compounds possesses chiral carbon?

(a) 

(b) 

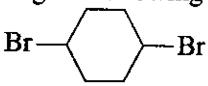
(c) 

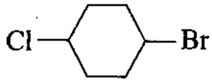
(d) 

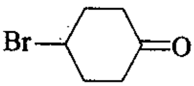
53. The number of chiral centers present in 3, 4-dibromo-2-pentanol is :

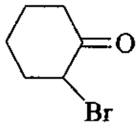
(a) 1 (b) 2 (c) 3 (d) 4

54. Among the following compounds, the one which can exhibit chirality is :

(a) 

(b) 

(c) 

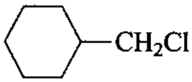
(d) 

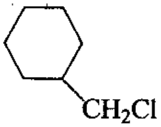
55. How many optically active stereoisomers are possible for 2, 3-butanediol ?

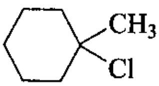
(a) 1 (b) 2 (c) 3 (d) 4

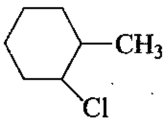
LEVEL-3

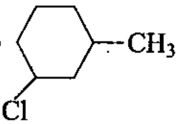
1. Which is not position isomer of *A*?

A : 

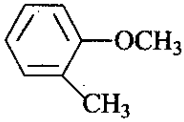
(a) 

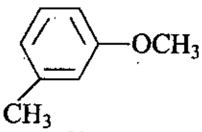
(b) 

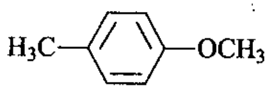
(c) 

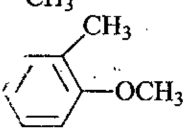
(d) 

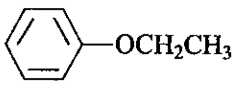
2. Metamer of compound *B* is :

B : 

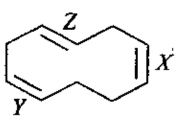
(a) 

(b) 

(c) 

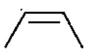
(d) 

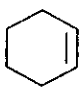
3. Types of geometrical isomerism shown at point *X*, *Y* and *Z* of the following compound respectively are :



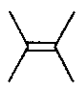
	X	*Y*	*Z*
(a)	*cis*	*cis*	*trans*
(b)	*cis*	*trans*	*trans*
(c)	*trans*	*cis*	*cis*
(d)	*cis*	*trans*	*cis*

4. *Cis-trans* isomerism is shown by :

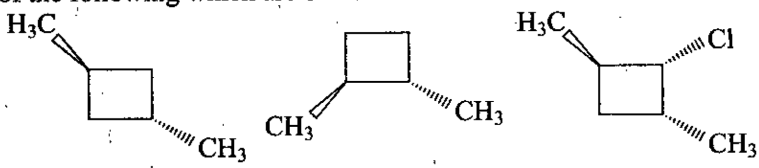
(a) 

(b) 

(c) 

(d) 

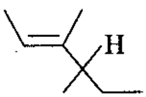
5. Out of the following which are chiral?

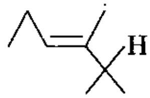


(A) (B) (C)

(a) *A*, *B* (b) *B*, *C* (c) *A*, *C* (d) Only *C*

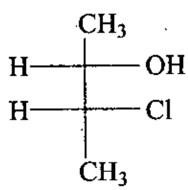
6. C_8H_{16} that can form *cis-trans* isomerism and also chiral center is :

(a) 

(b) 

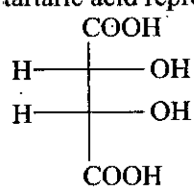
(c) both of these (d) none of these

7. Compound *A* below :

A : 

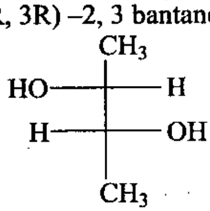
(a) is called threo enantiomer
(b) is called erythro enantiomer
(c) is called diastereomer
(d) is a racemic compound

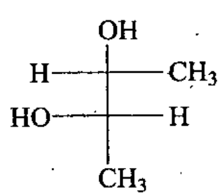
8. Following stereo-structure of tartaric acid represents :

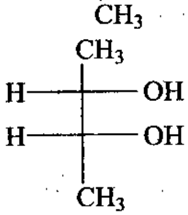


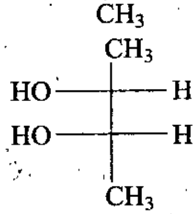
(a) *d* or *l* form (b) racemic form (c) *meso* form (d) *trans* form

9. (2R, 3R) –2, 3 bantanediol is :

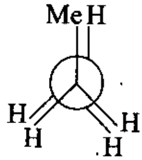
(a) 

(b) 

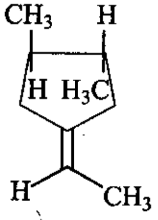
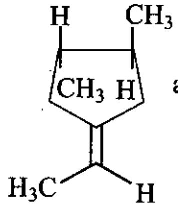
(c) 

(d) 

10. Following eclipsed form of propane is repeated after rotation of :

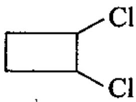
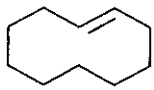


(a) 60° (b) 120° (c) 180° (d) 360°

11.  and  are :

(a) enantiomers (b) diastereomers
(c) geometrical isomers (d) same structure

12. Which of the following will form geometrical isomers?

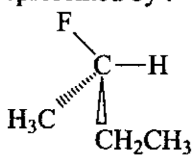
(a)  (b) $CH_3CH{=}NOH$ (c)  (d) All of these

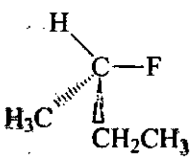
13. The number of enantiomers of the compound $CH_3-\underset{\text{Br}}{\underset{|}{C}H}-\underset{\text{Br}}{\underset{|}{C}H}-COOH$ is :

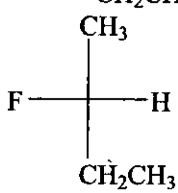
(a) 2 (b) 3 (c) 4 (d) 6

14. The structure of (S)-2-fluorobutane is best represented by :

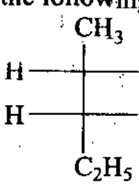
(a) $CH_3\underset{\text{F}}{\underset{|}{C}H}CH_2CH_3$

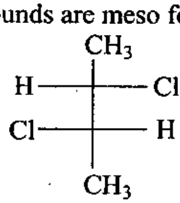
(b) 

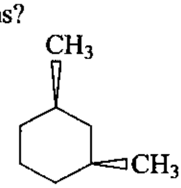
(c) 

(d) 

15. Which of the following compounds are meso forms?

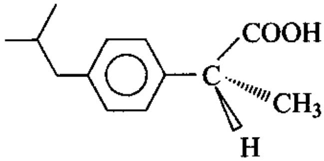

1

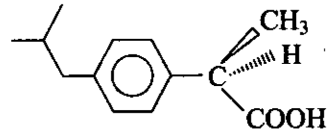

2

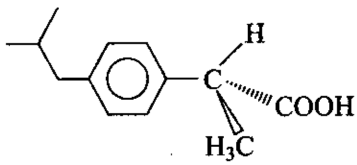

3

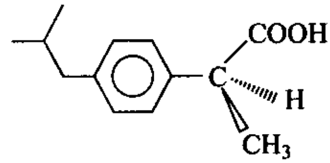
(a) 1 only (b) 3 only
(c) 1 and 2 (d) 2 and 3

16. The S enantiomer of ibuprofen is responsible for its pain-relieving properties, which one of the structures is (S)-ibuprofen?

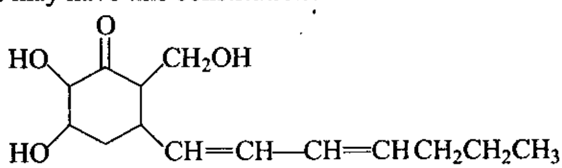
(a) 

(b) 

(c) 

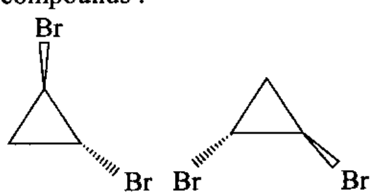
(d) 

17. A naturally occurring substance has the constitution shown. How many stereoisomers may have this constitution?



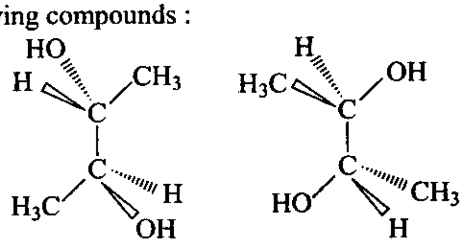
(a) 2 (b) 8 (c) 16 (d) 64

18. Relate the following compounds :



(a) same (b) enantiomers (c) diastereomers (d) meso

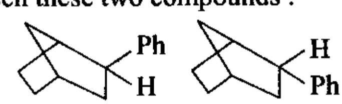
19. Relate the following compounds :



(a) homomers (b) enantiomers

(c) diastereomers (d) different compounds

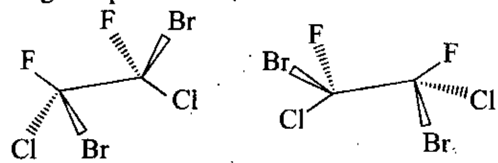
20. Identify relation between these two compounds :



(a) homomers (b) enantiomers

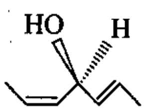
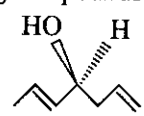
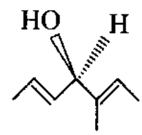
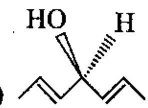
(c) diastereomers (d) different compounds

21. Relate the following compounds :



(a) homomers
(b) enantiomers
(c) diastereomers
(d) meso

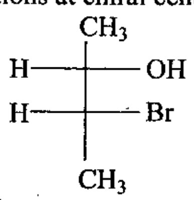
22. Which of the following compounds is achiral?

(a)  (b)  (c)  (d) 

23. The observed rotation of 2.0 gm of a compound in 10 mL solution in a 25 cm long polarimeter tube is + 13.4°. The specific rotation of compound is :
(a) +30.2° (b) –26.8° (c) +26.8° (d) + 40.2°

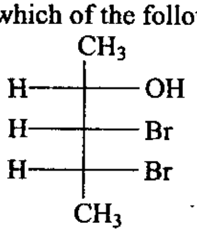
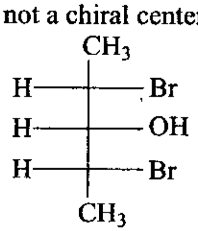
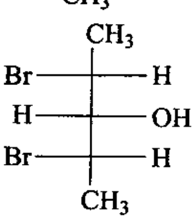
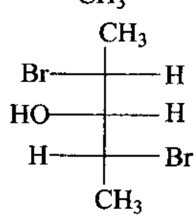
24. (+)-2-butanol has $[\theta]_{\lambda}^{25}$ = +13.9°. A sample of 2-butanol containing both the enantiomers was found to have a specific rotation value of –3.5° under similar condition. The percentage of the (+) and (–) enantiomer present in the sample are, respectively :
(a) 37.4% and 62.6%
(b) 62.6% and 37.4%
(c) 42.2% and 57.8%
(d) 35.5% and 64.5%

25. In the structure the configurations at chiral centers are :

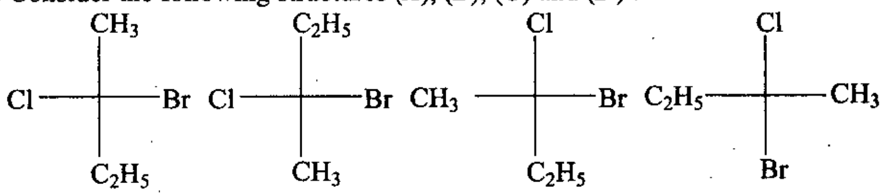


(a) 2R, 3R (b) 2S, 3R (c) 2R, 3S (d) 2S, 3S

26. In which of the following structures C-3 is not a chiral center ?

(a) 
(b) 
(c) 
(d) 

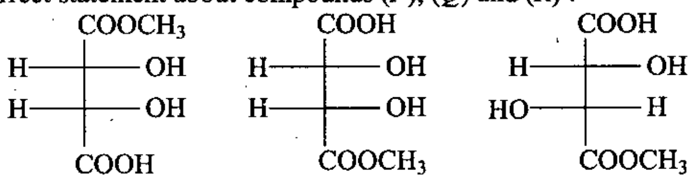
27. Consider the following structures (*A*), (*B*), (*C*) and (*D*) :



(*A*) (*B*) (*C*) (*D*)

(a) *B* and *C* are identical
(b) *A* and *B* are enantiomers
(c) *A* and *C* are enantiomers
(d) *B* and *D* are enantiomers

28. The correct statement about compounds (*P*), (*Q*) and (*R*) :



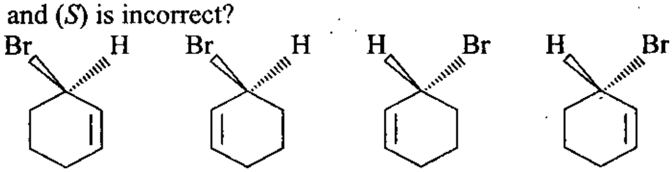
(*P*) (*Q*) (*R*)

(a) *P* and *Q* are identical
(b) *P* and *Q* are diastereomers
(c) *P* and *R* are enantiomers
(d) *P* and *Q* are enantiomers

29. Which of the following molecules is chiral?

(a) $CH_3CH_2CH{=}C{=}CH_2$
(b) $CH_3{-}CH{=}CH{-}CH{=}CH_2$
(c) $CH_3CH{=}C{=}CHCH_3$
(d) $CH_2{=}CH{-}CH_2{-}CH{=}CH_2$

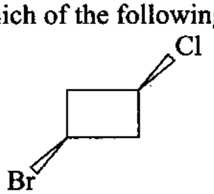
30. Which of the following statements about the relationships of the structure (*P*), (*Q*), (*R*) and (*S*) is incorrect?

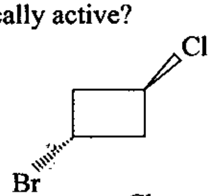


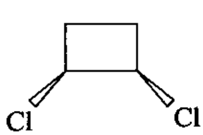
(*P*) (*Q*) (*R*) (*S*)

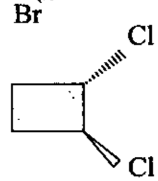
(a) *P* and *R* are enantiomers
(b) *P* and *R* are identical
(c) *Q* and *S* are identical
(d) *P* and *Q* are enantiomers

31. Which of the following compounds is optically active?

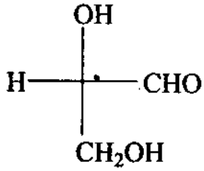
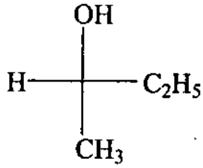
(a) 

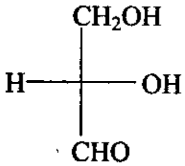
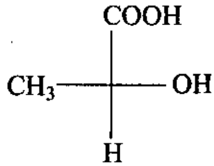
(b) 

(c) 

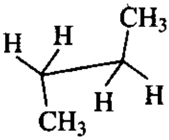
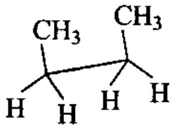
(d) 

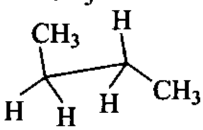
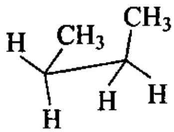
32. Which of the following structures has D-configuration?

(a)  (b) 

(c)  (d) 

33. Which of the following sawhorse projection formulae represents the gauche conformation of butane?

(a)  (b) 

(c)  (d) 

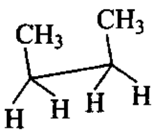
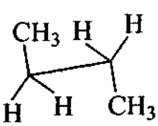
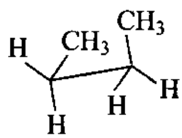
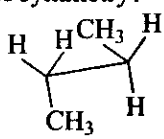
34. How many gauche conformations are possible for n-butane?

(a) 2 (b) 3 (c) 4 (d) 1

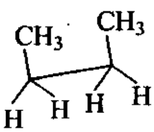
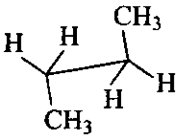
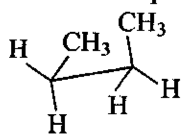
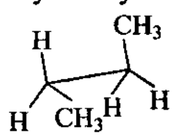
35. The most stable conformation of cyclohexane is :

(a) Boat (b) Half-chair (c) Chair (d) Twist-boat

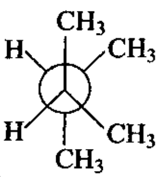
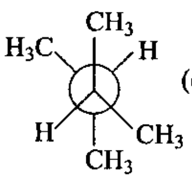
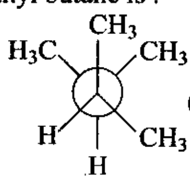
36. Which of the following conformation of n-butane has a center of symmetry?

(a)  (b)  (c)  (d) 

37. Which of the following conformations of n-butane has a plane of symmetry?

(a)  (b)  (c)  (d) 

38. The most stable conformation of 2, 3-dimethyl butane is :

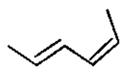
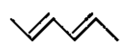
(a)  (b)  (c)  (d) None of these

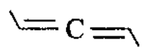
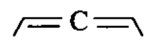
39. Total number of stereoisomers of the compound

$$CH_3-CH=CH-\underset{\displaystyle OH}{\underset{|}{CH}}-CH=CH-CH_3 \text{ is :}$$

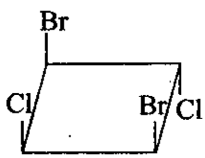
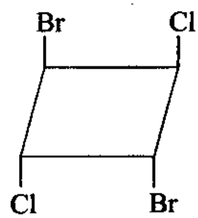
(a) 2 (b) 3 (c) 4 (d) 8

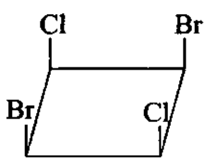
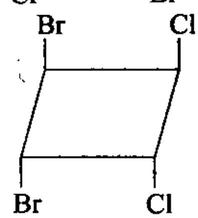
40. Which of the following pairs of structures represents conformation isomers?

(a)  and 
(b)  and 

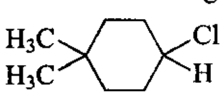
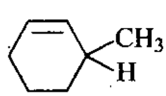
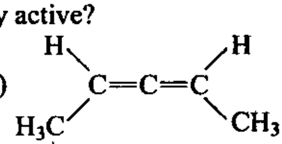
(c)  and 
(d)  and 

41. Which of the following structures is chiral?

(a) 
(b) 

(c) 
(d) 

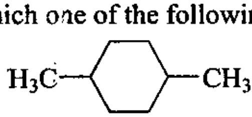
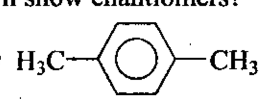
42. Which of the following compounds can be optically active?

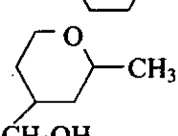
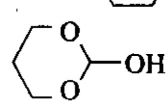
(a)  (b)  (c) 

Select correct answer using the codes given :

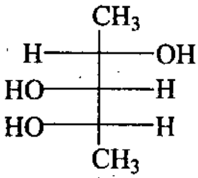
(a) 1 and 3 (b) 1 and 2
(c) 2 and 3 (d) 1, 2 and 3

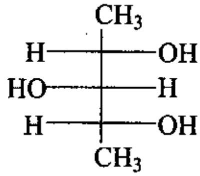
43. Which one of the following compounds will show enantiomers?

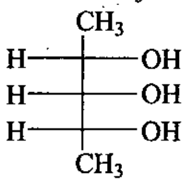
(a) 
(b) 

(c) 
(d) 

44. The meso form of 2, 3, 4-pentanetriol is :

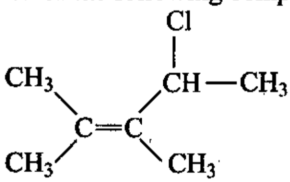
(a) 

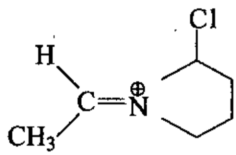
(b) 

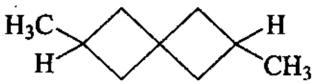
(c) 

(d) Both (b) and (c)

45. Which of the following compounds is chiral?

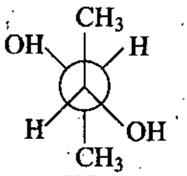
(a) 

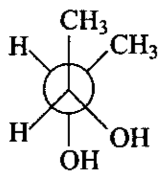
(b) 

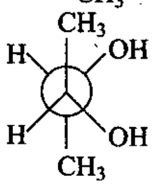
(c) 

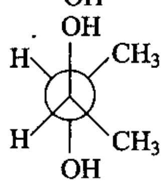
(d) All of these

46. Which one of the following is the most stable conformer?

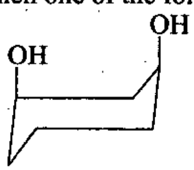
(a) 

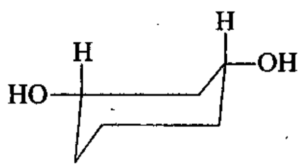
(b) 

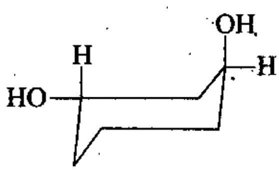
(c) 

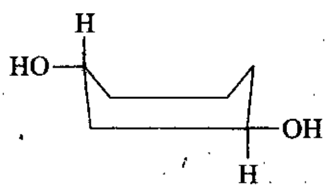
(d) 

47. Which one of the following is most stable?

(a) 

(b) 

(c) 

(d) 

48. Which among the following compounds will show geometrical isomers?

(a) $CH_3-CH=CH_2$

(b) $CH_3-\underset{\underset{\displaystyle CH_3}{|}}{C}=CH_2$

(c) $CH_3-\underset{\underset{\displaystyle CH_3}{|}}{C}=CHD$

(d) $CH_3-CH=CHD$

49. First member of optically active alkene is :

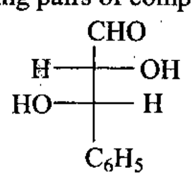
(a) $C_2H_5-\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle H}{|}}{C}}-CH=CH_2$

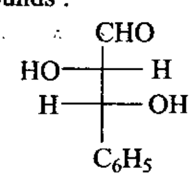
(b) $C_3H_7-\overset{\overset{\displaystyle C_2H_5}{|}}{\underset{\underset{\displaystyle H}{|}}{C}}-CH=CH_2$

(c) $C_3H_7-\overset{\overset{\displaystyle C_2H_5}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}-CH=CH_2$

(d) $C_6H_{11}-\overset{\overset{\displaystyle C_2H_5}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}-CH=CH_2$

50. Consider the following pairs of compounds :


(I)

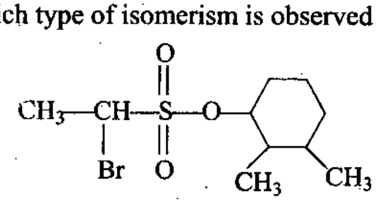

(II)

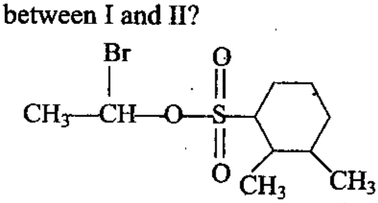
Which among the following statements is correct?

1. Both are enantiomers
2. Both are in threo form
3. Both are diastereomers
4. Both are in erythro form

(a) 1 and 2
(b) 1, 2 and 3
(c) 2 and 3
(d) 3 and 4

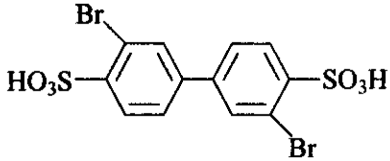
51. Which type of isomerism is observed between I and II?


(I)

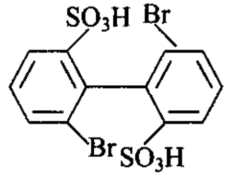

(II)

(a) Functional isomerism
(b) Metamerism
(c) Optical isomerism
(d) Geometrical isomerism

52. Mention the correct relationship between I and II :



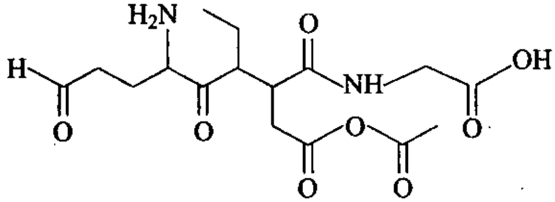
(I)



(II)

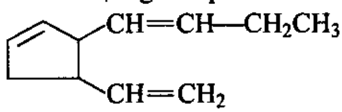
(a) Chain isomer
(b) Position isomer
(c) Identical
(d) Stereoisomer

53. Number of functional groups present in the following compound is :



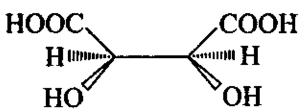
(a) 5
(b) 7
(c) 6
(d) 8

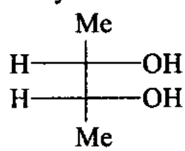
54. Stereoisomer possible for following compound :

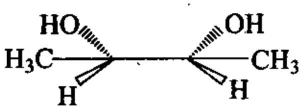


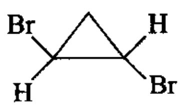
(a) 8
(b) 16
(c) 32
(d) 64

55. Which of the following will show optical activity?

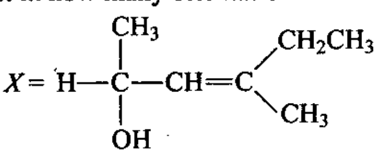
(a) 

(b) 

(c) 

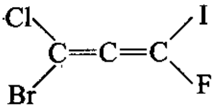
(d) 

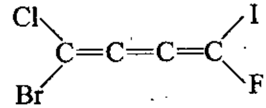
56. Compound X can exist in how many orientations?

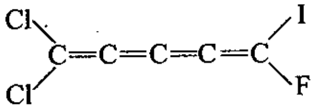


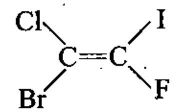
(a) 1
(b) 2
(c) 3
(d) 4

57. Which of the following will not have any stereoisomer?

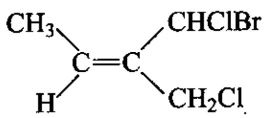
(a) 

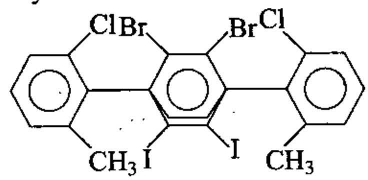
(b) 

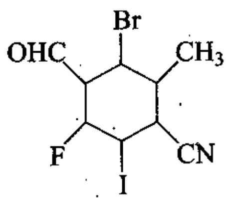
(c) 

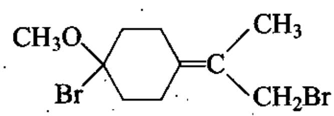
(d) 

58. Which of the following compounds is optically inactive?

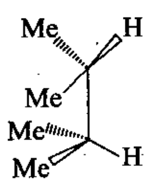
(a) 

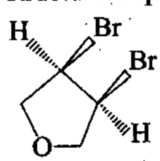
(b) 

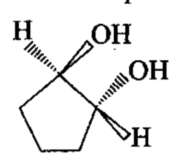
(c) 

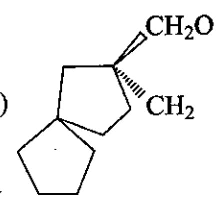
(d) 

59. Which of the following structures represent meso compound?

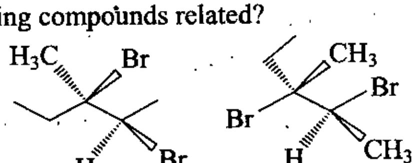
(a) 

(b) 

(c) 

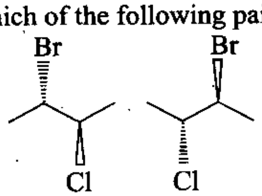
(d) 

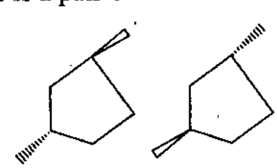
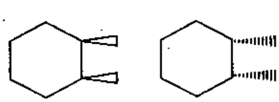
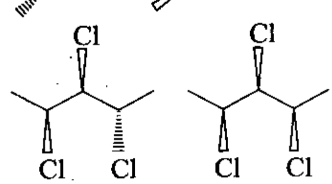
60. How are the following compounds related?



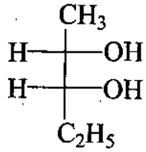
(a) Diastereomers (b) Enantiomers (c) Meso form (d) Identical

61. Which of the following pairs of compounds is a pair of enantiomers?

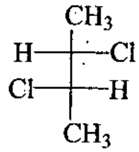
(a) 

(b) 
(c) 
(d) 

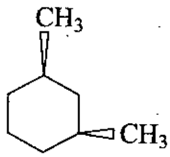
62. Which of the following compounds are meso forms?



(1)



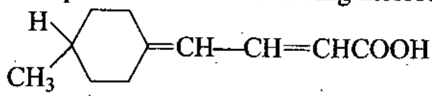
(2)



(3)

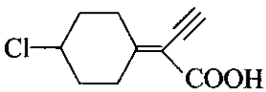
(a) 1 only (b) 3 only (c) 1 and 2 (d) 2 and 3

63. How many isomers are possible for the following molecule?



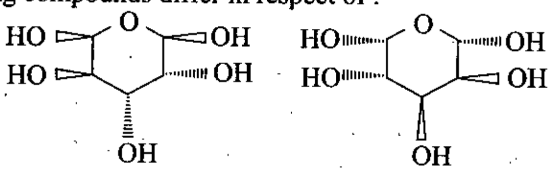
(a) 1 (b) 2 (c) 3 (d) 4

64. What are the correct designations for the structure below?



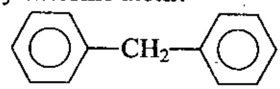
(a) *E*, *E*
(b) *Z*, *E*
(c) *E*, *Z*
(d) No stereoisomerism is possible

65. The following compounds differ in respect of :



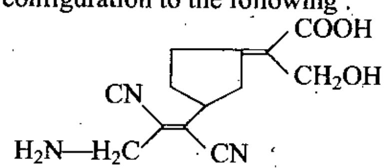
(a) their chemical and physical properties
(b) the direction in which they rotate plane of polarized light
(c) their interaction with molecule
(d) all are correct

66. How many structural isomers are possible when one of the hydrogen in compound given below is replaced by chlorine atom?



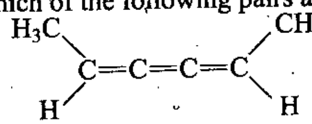
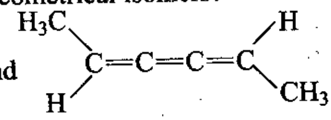
(a) 6 (b) 4 (c) 8 (d) 7

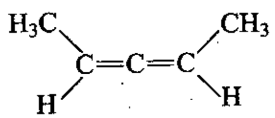
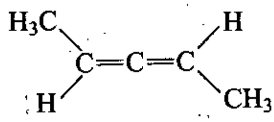
67. Assign double bond configuration to the following :



(a) *E* (b) *Z* (c) *E*, *Z* (d) *Z*, *Z*

68. Which of the following pairs are geometrical isomers?

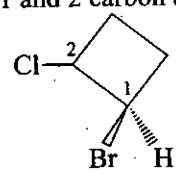
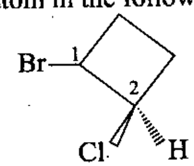
(a)  and 

(b)  and 

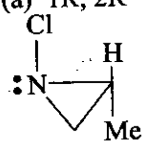
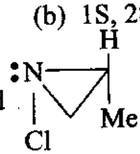
(c) Both (a) and (b)

(d) None of the above

69. The configuration of 1 and 2 carbon atom in the following compounds is :

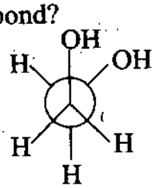
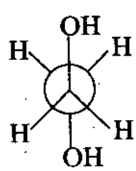
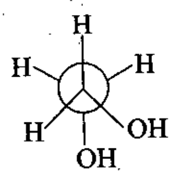
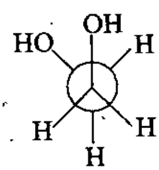
(a) 1R, 2R (b) 1S, 2S (c) 1R, 2S (d) 1S, 2R

70.  and  are :

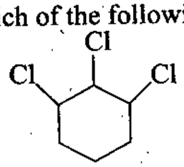
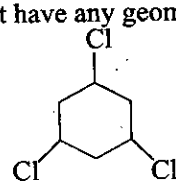
(a) *d* and *l* isomer (b) *cis* and *trans* isomer

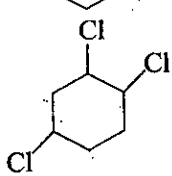
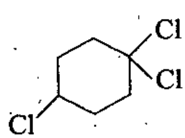
(c) functional isomer (d) position isomer

71. Which of the following conformers of 1, 2-diol cannot form intramolecular H-bond?

(a)  (b)  (c)  (d) 

72. Which of the following compounds does not have any geometrical isomer?

(a)  (b) 

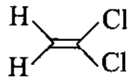
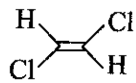
(c)  (d) 

73. If a mixture of 2-bromobutane has enantiomeric excess of 50% of (+)-2-bromobutane, the stereoisomeric composition of the mixture with respect to (+) and (–) enantiomer respectively is :

(a) 75% (+) and 25% (–) (b) 70% (+) and 30% (–)

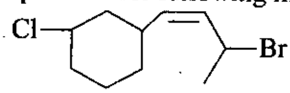
(c) 80% (+) and 20% (–) (d) 25% (+) and 75% (–)

74. The following compounds differ in :

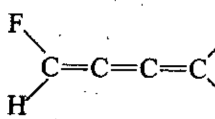
(a) configuration (b) conformation (c) structure (d) chirality

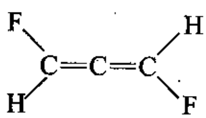
75. How many stereomers are possible for following molecule?

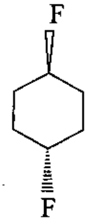


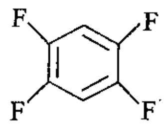
(a) 4 (b) 8 (c) 12 (d) 16

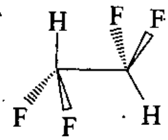
76. Which of the following molecules have dipole moment?


(*A*)


(*B*)

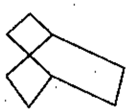
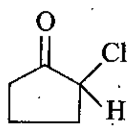
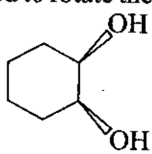
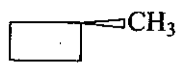

(*C*)


(*D*)

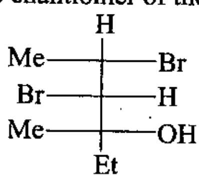

(*E*)

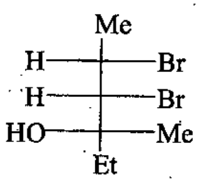
(a) *A* and *D* (b) *B* and *C* (c) *C* and *E* (d) *B* and *E*

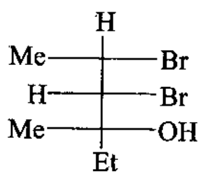
77. Which of the following molecules is expected to rotate the plane polarized light?

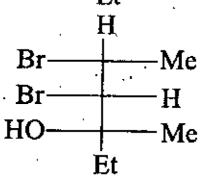
(a) 
(b) 
(c) 
(d) 

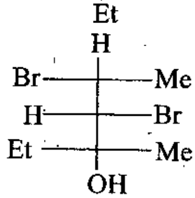
78. Which of the following is the enantiomer of the compound shown below?



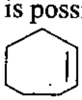
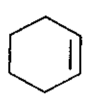
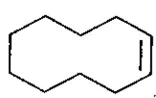
(a) 

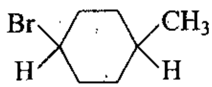
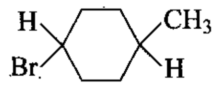
(b) 

(c) 

(d) 

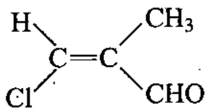
79. Geometrical isomerism is possible in :

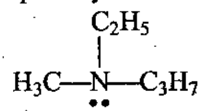
(a) 
(b) 
(c) 
(d) 

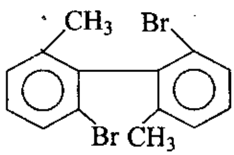
80.  and  are :

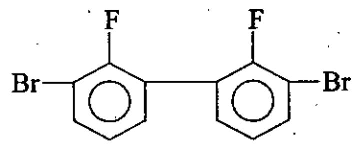
(a) enantiomers (b) diastereomers
(c) conformers (d) homologous

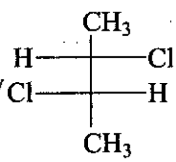
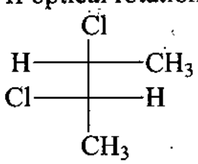
81. Which of the following compounds will be optically active?

(a) 

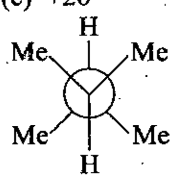
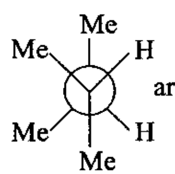
(b) 

(c) 

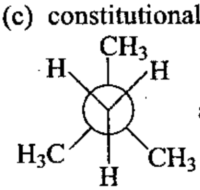
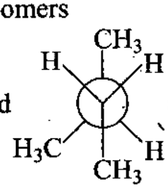
(d) 

82. If optical rotation produced by  is 36° then that produced by  is :

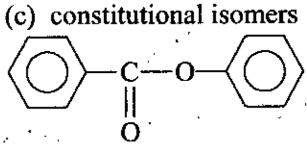
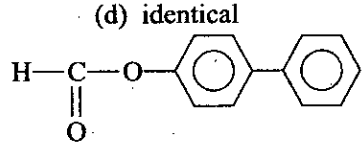
(a) –36° (b) 0°
(c) +26° (d) Unpredictable

83.  and  are :

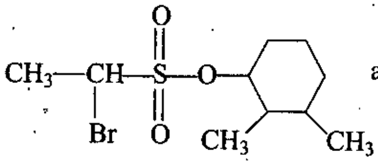
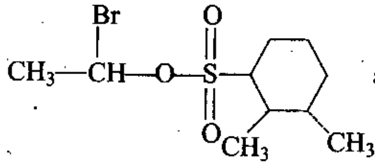
(a) conformational isomers (b) configurational isomers
(c) constitutional isomers (d) identical

84.  and  are :

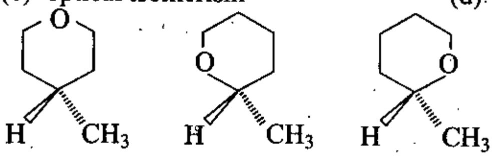
(a) conformational isomers (b) stereoisomers
(c) constitutional isomers (d) identical

85.  and  are :

(a) position isomers (b) chain isomers
(c) functional isomers (d) metamers

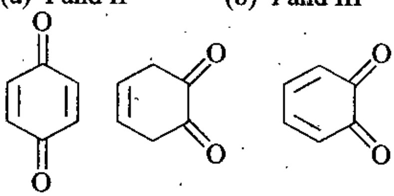
86.  and  are :

(a) functional group isomers (b) metamerism
(c) optical isomerism (d) geometrical isomerism

87. 

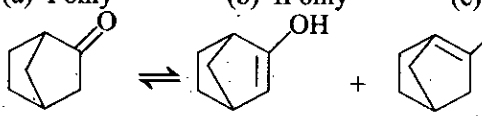
I II III

Which among these are stereoisomers?
(a) I and II (b) I and III (c) II and III (d) all of these

88. 

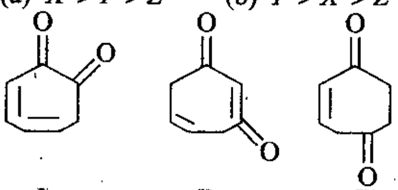
I II III

Which among these can exhibit tautomerism?
(a) I only (b) II only (c) I and III (d) II and III

89. 

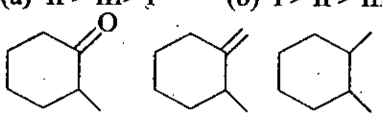
(*X*) (*Y*) (*Z*)

Stability order among these tautomer is :
(a) $X > Y > Z$ (b) $Y > X > Z$ (c) $Z > X > Y$ (d) $Y > Z > X$

90. 

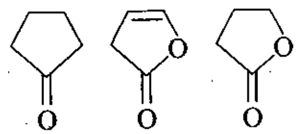
I II III

Among these compounds, the order of enol content should be :
(a) II > III> I (b) I > II > III (c) III > II > I (d) I > III > II

91. 

I II III

Which of these compounds will exhibit geometrical isomerism?
(a) I (b) II
(c) III (d) None of these

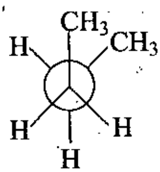
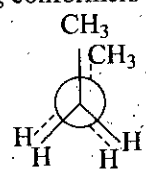
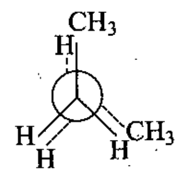
92. 

I II III

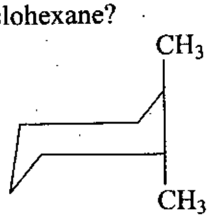
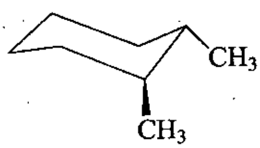
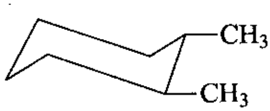
Among these compounds the order of enol content should be :

(a) I > II > III
(b) III > II > I
(c) II > I > III
(d) II > III > I

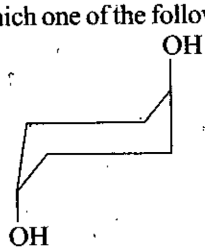
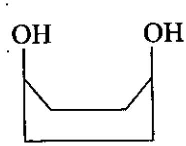
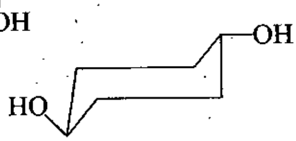
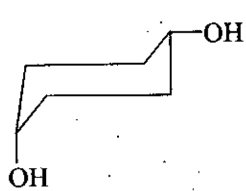
93. Which of the following conformers of *n*-butane has torsional strain?

(a) 
(b) 
(c) 
(d) Both (b) and (c)

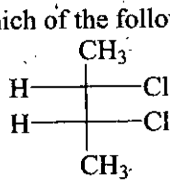
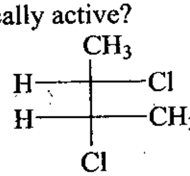
94. Which one of the following is most preferred conformation of 1, 2-dimethyl cyclohexane?

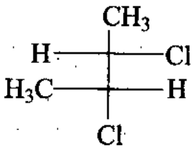
(a) 
(b) 
(c) 
(d) All are correct

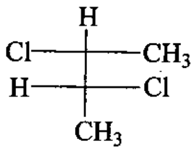
95. Which one of the following is the most stabilised conformer of 1, 4-cyclohexane diol?

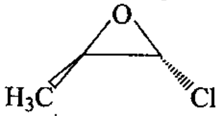
(a) 
(b) 
(c) 
(d) 

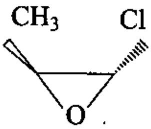
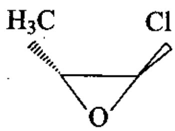
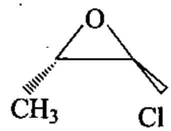
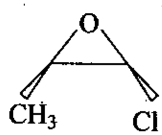
96. Which of the following compounds is optically active?

(a) 
(b) 

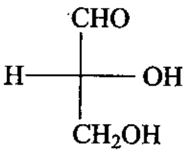
(c) 

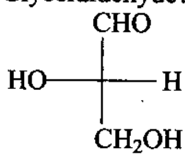
(d) 

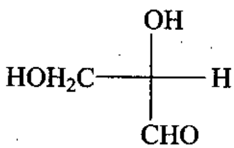
97. Which of the following is Homomer of  ?

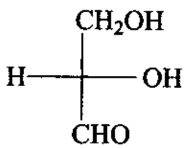
(a)  (b)  (c)  (d) 

98. Which one of the following structures is *D*-Glyceraldehyde?

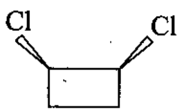
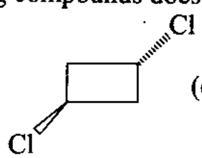
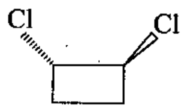
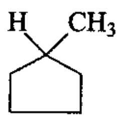
(a) 

(b) 

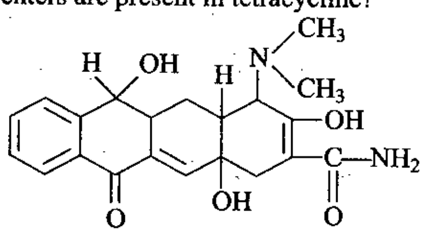
(c) 

(d) 

99. Which of the following compounds does not contain the plane of symmetry?

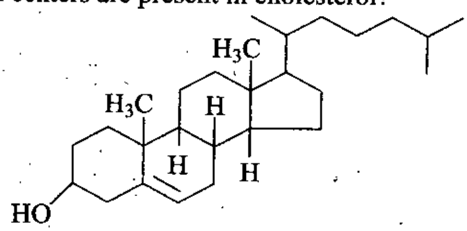
(a)  (b)  (c)  (d) 

100. How many chiral centers are present in tetracycline?



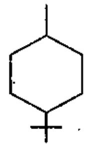
(a) 6 (b) 4 (c) 8 (d) 5

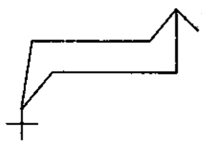
101. How many chiral centers are present in cholesterol?

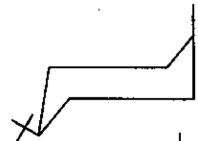


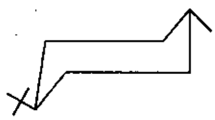
(a) 7 (b) 8 (c) 9 (d) 5

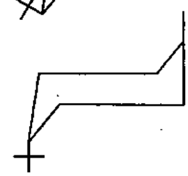
102. Which of the following is the most stabilised conformer of

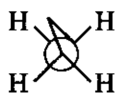
 ?

(a) 

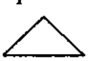
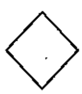
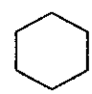
(b) 

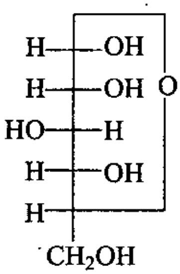
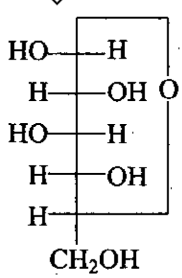
(c) 

(d) 

103. Y = 

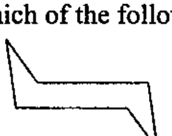
Compound Y is projection formula of :

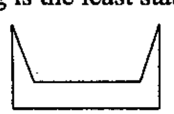
(a)  (b)  (c)  (d) 

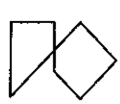
104.  and  are :

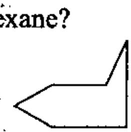
(a) diastereomers
(b) enantiomers
(c) tautomers
(d) conformers

105. Which of the following is the least stable conformer of cyclohexane?

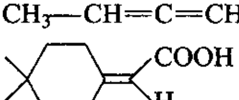
(a) 
(Chair)

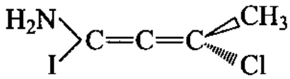
(b) 
(Boat)

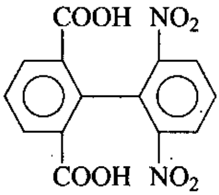
(c) 
(Twist boat)

(d) 
(Half chair)

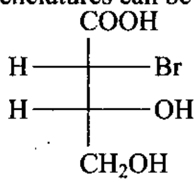
106. Which of the following pairs is correctly matched?
(a) $CH_3—CH{=}C{=}CH_2$; optically active

(b)  ; optically active

(c)  ; optically active

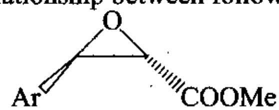
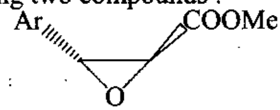
(d) 

107. Which of the following nomenclatures can be used for given conformation?



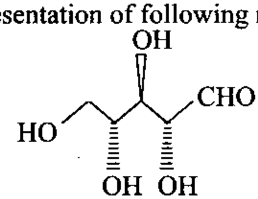
(a) Only D, L
(b) Only erythro, threo
(c) D/L, Erythro/threo
(d) D/L, R/S, Erythro/threo

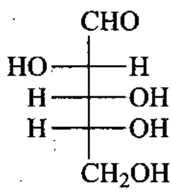
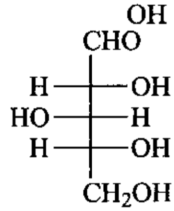
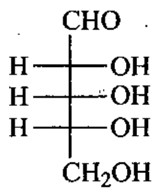
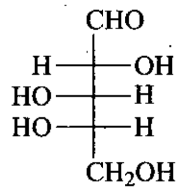
108. Find out relationship between following two compounds :

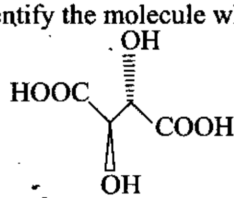
(a) Enantiomer (b) Homomer (c) Diastereomer (d) None of these

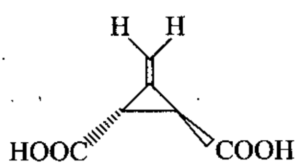
109. Identify correct 2-*D* representation of following molecule.

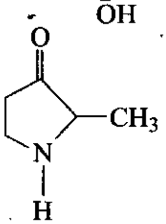


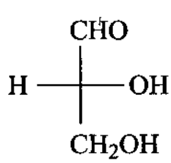
(a)  (b)  (c)  (d) 

110. Identify the molecule which is meso.

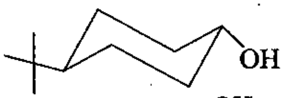
(a) 

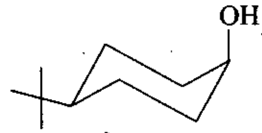
(b) 

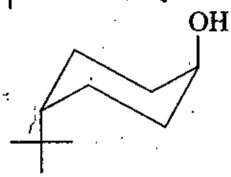
(c) 

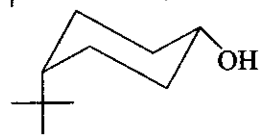
(d) 

111. Find outmost stabilise conformer of following molecule.

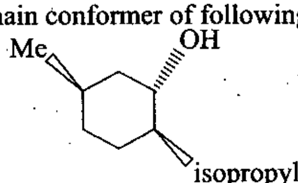
(a) 

(b) 

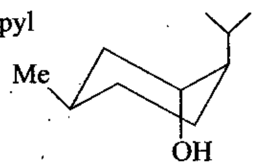
(c) 

(d) 

112. Identify stabilise chain conformer of following molecule.



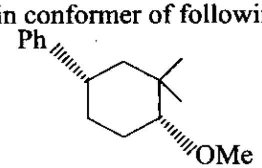
(a) 

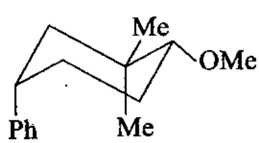
(b) 

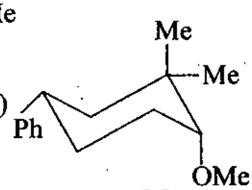
(c) 

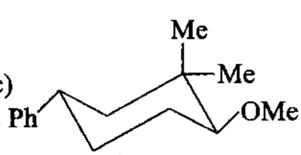
(d) None of these

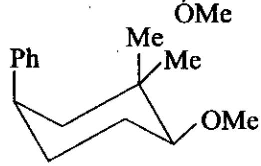
113. Identify stabilise chain conformer of following molecule.



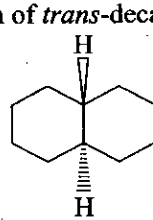
(a) 

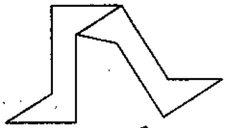
(b) 

(c) 

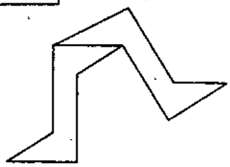
(d) 

114. Find out correct representation of *trans*-decaline.



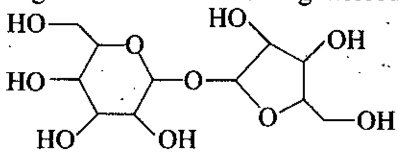
(a) 

(b) 

(c) 

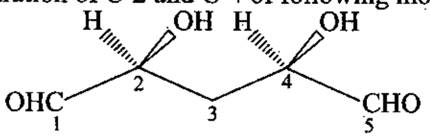
(d) None of these

115. Calculate no. of stereogenic center in following molecule.



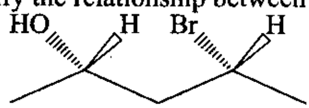
(a) 8 (b) 7 (c) 10 (d) 9

116. Assign the configuration of C-2 and C-4 of following molecule.

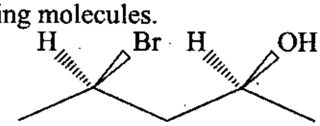


(a) S,R (b) R, R (c) S, S (d) R, S

117. Identify the relationship between following molecules.

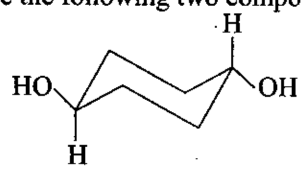


and

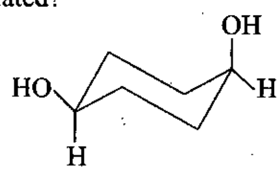


(a) Enantiomer (b) Diastereomer (c) Homomer (d) Both are meso

118. How are the following two compounds related?

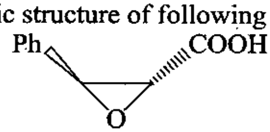


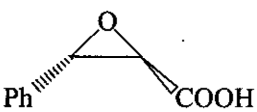
and

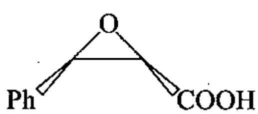


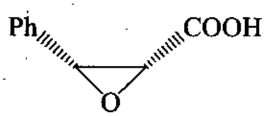
(a) Enantiomer (b) Diastereomer
(c) Homomer (d) Racemic mixture

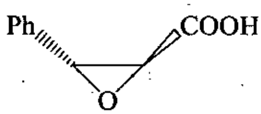
119. Find out enantiomeric structure of following compound :



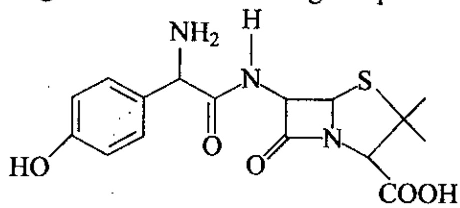
(a) 

(b) 

(c) 

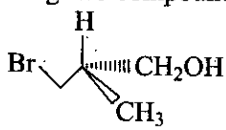
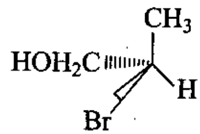
(d) 

120. Find out no. of sterogenic center in following compound :



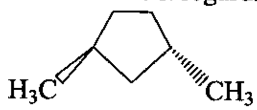
(a) 4 (b) 5 (c) 3 (d) 6

121. How are the following two compounds are related?

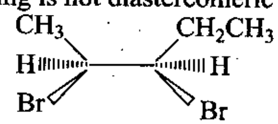
(a) Constitutional isomer (b) Diastereomer
(c) Enantiomer (d) Homomer

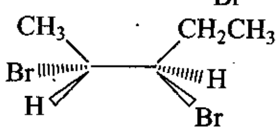
122. Choose incorrect statement regarding following compounds :

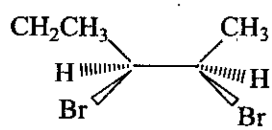
 and 

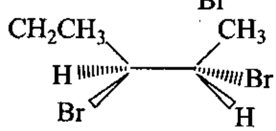
(a) The boiling point of both compounds are same
(b) Both are optically active
(c) Equal mixture of both compounds are optically inactive
(d) Both are diastereomers

123. Which of the following is not diastereomeric structure of given compound?



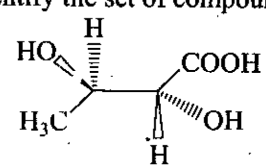
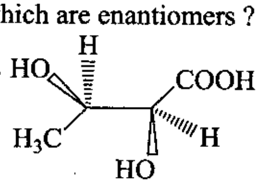
(a) 

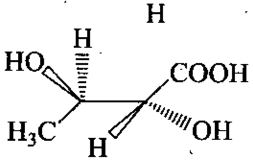
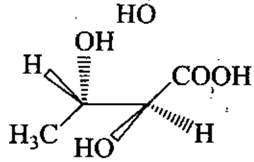
(b) 

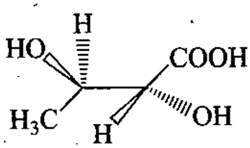
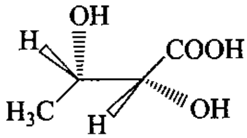
(c) 

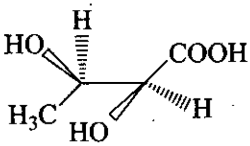
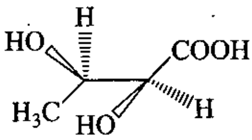
(d) None of these

124. Identify the set of compounds which are enantiomers ?

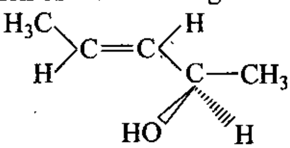
(a)  and 

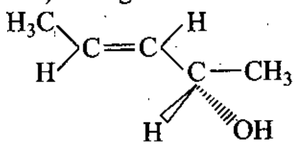
(b)  and 

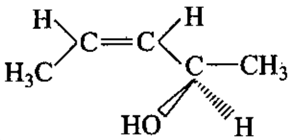
(c)  and 

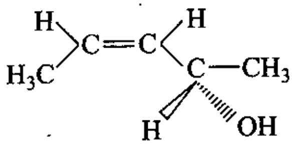
(d)  and 

125. Which of the following molecule have (2*R*, 3-*Z*) configuration?

(a) 

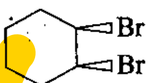
(b) 

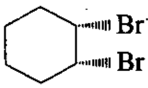
(c) 

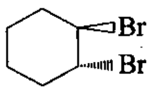
(d) 

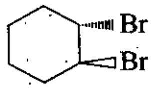
EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Select '*cis*' isomer among the following :

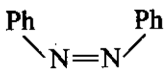
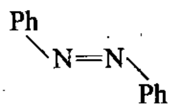
(a) 

(b) 

(c) 

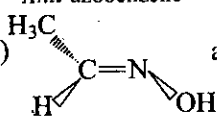
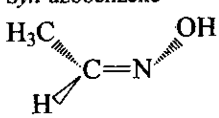
(d) 

2. For which of the following pairs of compounds are the correct notations given?

(a)  and 

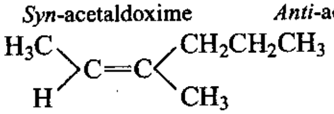
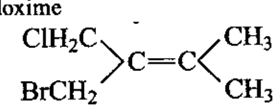
Anti-azobenzene

Syn-azobenzene

(b)  and 

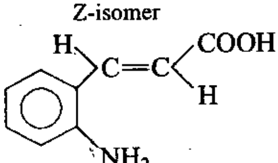
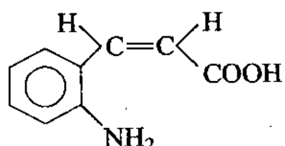
Syn-acetaldoxime

Anti-acetaldoxime

(c)  and 

Z-isomer

E-isomer

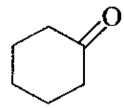
(d)  and 

Trans-*o*-amino cinnamic acid

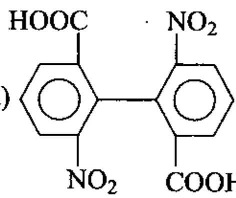
Cis-*o*-amino cinnamic acid

3. Which of the following compounds will exhibit geometrical isomerism?

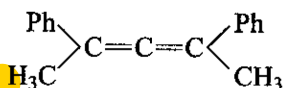
(a) $CH_3—CH{=}CH—COOH$ (b) $Br—CH{=}CH—Br$

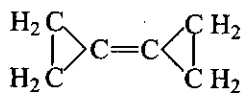
(c) $C_6H_5—CH{=}N—OH$ (d) 

4. Which of the following compounds exhibit optical isomerism?

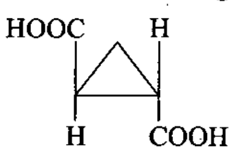
(a) 

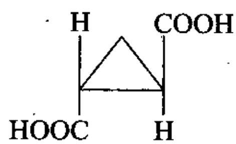
(b) $H_2C{=}C{=}CH_2$

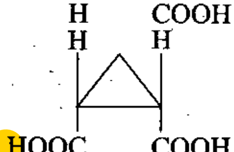
(c) 

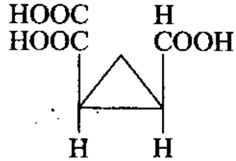
(d) 

5. Which of the following represents a pair of enantiomers?

(a) 

(b) 

(c) 

(d) 

6. Which of the following represent correct matching?

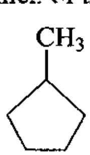
(a) $CH_3—\overset{O}{\overset{\parallel}{C}}—OH$ and $H—\overset{O}{\overset{\parallel}{C}}—OCH_3$ Metamers

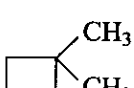
(b) $CH_3—CH_2—C{\equiv}CH$ and $CH_3—C{\equiv}C—CH_3$ Position isomers

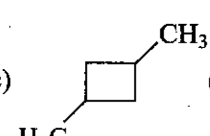
(c) $CH_3CH_2CH_2NH_2$ and $CH_3—\underset{NH_2}{\underset{|}{CH}}—CH_3$ Tautomers

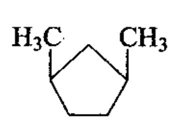
(d) CH_3CH_2OH and $(CH_3)_2O$ Functional isomers

7. Which of the following cycloalkanes will show *cis-trans* isomerism?

(a) 

(b) 

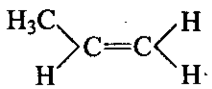
(c) 

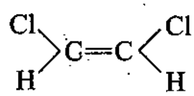
(d) 

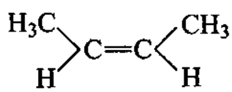
8. Which of the following are correctly matched?

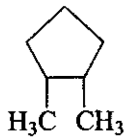
Compounds	Number of geometrical isomers
(a) $CH_3—CH=CH—CH=CH—Ph$	4
(b) $CH_3—(CH=CH)_4—CH_3$	2
(c) $H_2C=CH—CH=CH_2$	10
(d) $H_3C—(CH=CH)_5—CH_3$	20

9. Which of the following will have a *trans* isomer?

(a) 

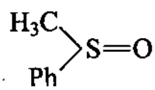
(b) 

(c) 

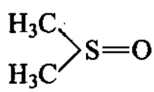
(d) 

10. Which of the following is chiral?

(a) $C_2H_5—\overset{\displaystyle CH_3}{\underset{\displaystyle C_6H_5}{P}}=O$

(b) 

(c) $C_2H_5—\overset{\displaystyle CH_3}{\underset{\displaystyle C_6H_5}{N^{\oplus}}}—H$

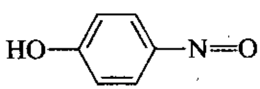
(d) 

11. Which of the following compounds show tautomerism?

(a) $NH_2—\overset{\displaystyle O}{\overset{\|}{C}}—NH_2$

(b) $NH_2—\overset{\displaystyle S}{\overset{\|}{C}}—NH_2$

(c) $CH_3—\overset{\displaystyle O}{\overset{\|}{C}}—CH_3$

(d) 

12. Keto-enol tautomerism is observed in :

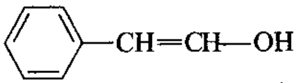
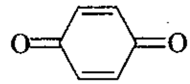
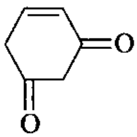
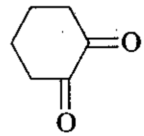
(a) $C_6H_5—\overset{\displaystyle O}{\overset{\|}{C}}—H$

(b) $C_6H_5—\overset{\displaystyle O}{\overset{\|}{C}}—CH_3$

(c) $Ph—\overset{\displaystyle O}{\overset{\|}{C}}—Ph$

(d) $Ph—\overset{\displaystyle O}{\overset{\|}{C}}—CH_2—\overset{\displaystyle O}{\overset{\|}{C}}—CH_3$

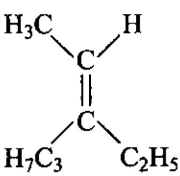
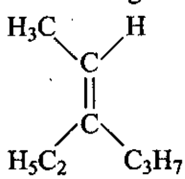
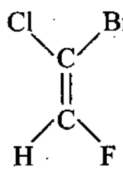
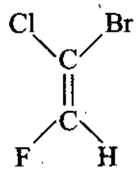
13. Tautomerism is exhibited by :

(a) 
(b) 
(c) 
(d) 

14. *Cis*-2-butene and *trans*-2-butene are :
(a) geometrical isomers
(b) diastereomers
(c) enantiomers
(d) position isomers

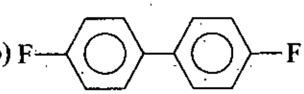
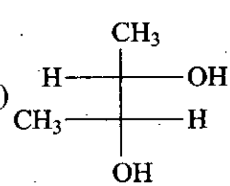
15. Which of the following can exist in *syn* and *anti* form?
(a) Ph—N=N—OH
(b) Ph—N=N—Ph
(c) Ph—CH=N—OH
(d) Ph_2C=N—OH

16. The *Z*-isomers among the following are :

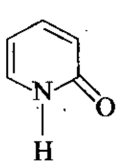
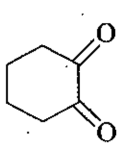
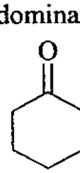
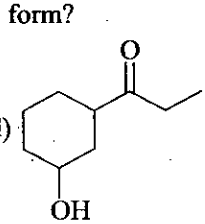
(a) 
(b) 
(c) 
(d) 

17. Which of the following statements are correct about tautomers?
(a) They possess different electronic and atomic rearrangement
(b) They possess different electronic but same atomic arrangement
(c) They have different atomic arrangement but same electronic arrangement
(d) They exist in equilibrium

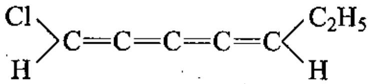
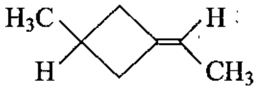
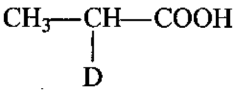
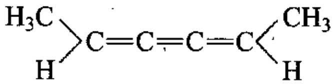
18. Which of the following compounds would be optically inactive?

(a) $H_2C=C=CH_2$
(b) 
(c) $H_3C—CH=C=CH—CH_3$
(d) 

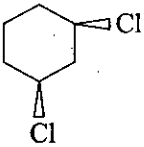
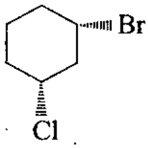
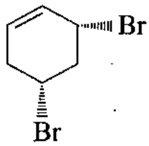
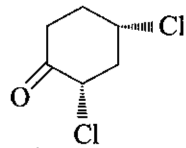
19. In which of the following the enol form is dominant over keto form?

(a) 
(b) 
(c) 
(d) 

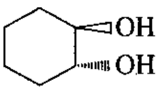
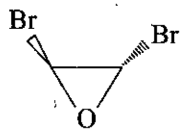
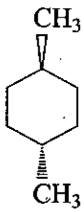
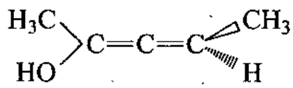
20. Which of the following are optically active?

(a) 
(b) 
(c) 
(d) 

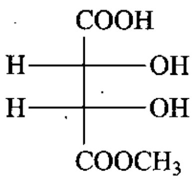
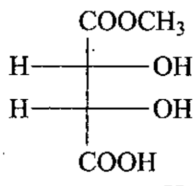
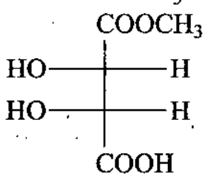
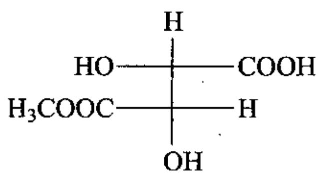
21. Which of the following compounds do not have the plane of symmetry?

(a) 
(b) 
(c) 
(d) 

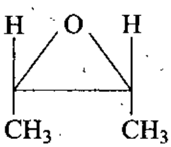
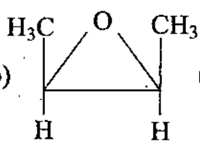
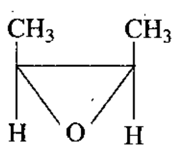
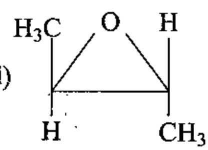
22. Which of the following are optically active?

(a) 
(b) 
(c) 
(d) 

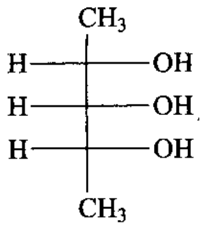
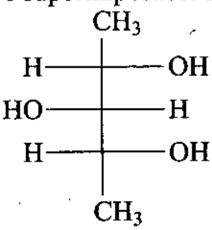
23. Which of the following are identical molecules?

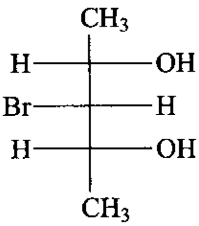
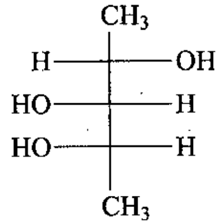
(a) 
(b) 
(c) 
(d) 

24. Which of the following are identical molecules?

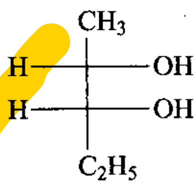
(a) 
(b) 
(c) 
(d) 

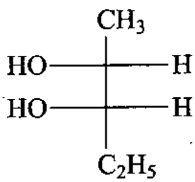
25. Which of the following compounds can have superimposable mirror image?

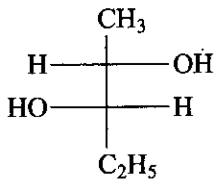
(a) 
(b) 

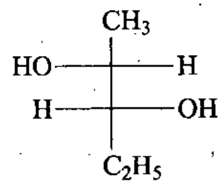
(c) 
(d) 

26.


I

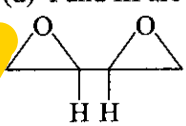

II

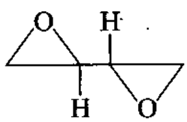

III

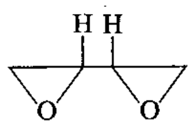

IV

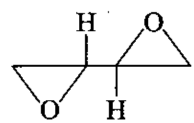
Which of the following statements are true about these isomers?
(a) I and II are a pair of enantiomers
(b) III and IV are a pair of enantiomers
(c) II is the diastereomer of III and IV
(d) I and III are homomers

27.


I

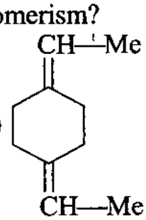

II

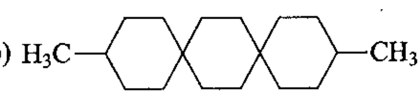

III

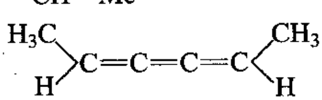

IV

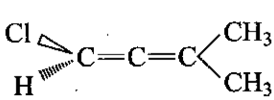
Which of the following statements are correct about these molecules?
(a) I is a meso compound
(b) I and III are identical
(c) II and IV are a pair of enantiomers
(d) II and III are diastereomers

28. Which of the following compounds are optically inactive but exhibit geometrical isomerism?

(a) 

(b) 

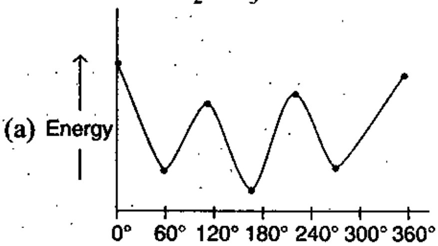
(c) 

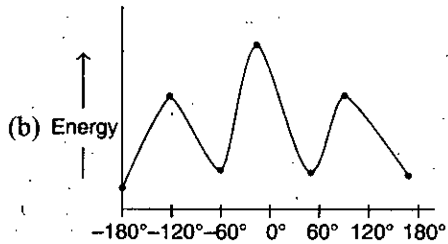
(d) 

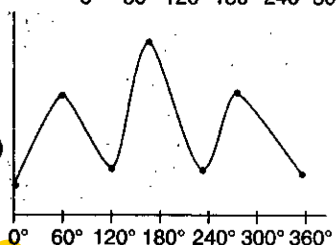
29. Magnitude of specific rotation of a compound is independent of :
(a) solvent (b) concentration (c) length of tube (d) temperature

30. Enantiomers have :
(a) all physical properties same except their action on plane polarized light which is equal in magnitude but opposite in direction.
(b) all chemical properties same except when reagent is chiral in that case, reactivity of enantiomer will be different.
(c) opposite configuration of all chiral centers according to CIP rule.
(d) superimposable image of each other.

31. Which of the following plots are correct for potential energy of butane as a function about C_2-C_3 bond?

(a) 

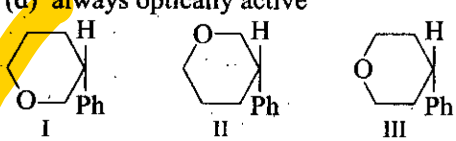
(b) 

(c) 

(d) All are incorrect

32. A pair of enantiomers is :
(a) a pair of non superimposable mirror image of each other
(b) a pair of superimposable image of each other
(c) always optically active if one is dextrorotatory then other will be laevorotatory by same magnitude
(d) compounds having same boiling points

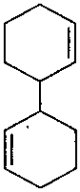
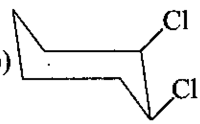
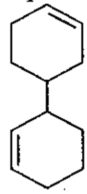
33. A racemic mixture is :
(a) always equimolar mixture of a pair of enantiomers
(b) always equimolar mixture of a pair of diastereomers
(c) always optically inactive
(d) always optically active

34. 

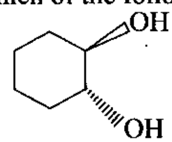
Which of the following statements are true about these molecules?
(a) I and II are a pair of enantiomers
(b) III is metamer of I and II

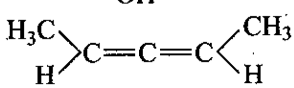
(c) III is diastereomer of I and II
(d) III is not stereoisomer of I and II

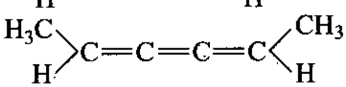
35. Which of the following compounds have the plane of symmetry?

(a)  (b)  (c)  (d) 

36. Which of the following compounds can exhibit geometrical isomerism?

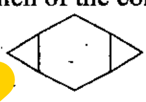
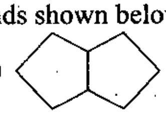
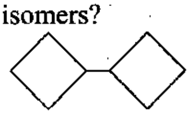
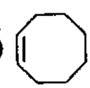
(a) 

(b) 

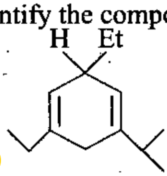
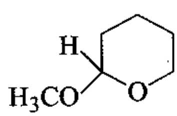
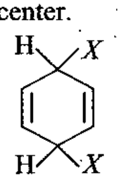
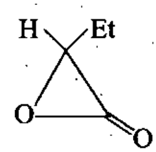
(c) 

(d) C_2H_5—CH═CH—CH═CH—CH_3

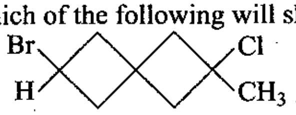
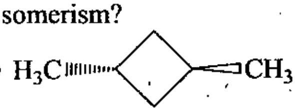
37. Which of the compounds shown below are isomers?

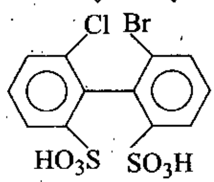
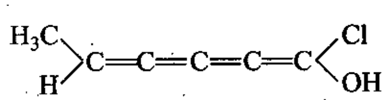
(a)  (b)  (c)  (d) 

38. Identify the compound which has a stereo center.

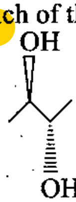
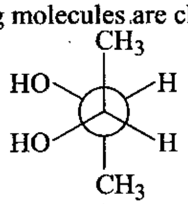
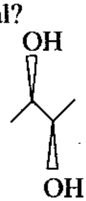
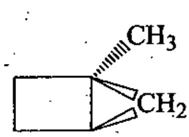
(a)  (b)  (c)  (d) 

39. Which of the following will show optical isomerism?

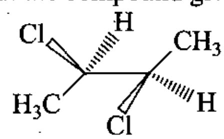
(a)  (b) 

(c)  (d) 

40. Which of the following molecules are chiral?

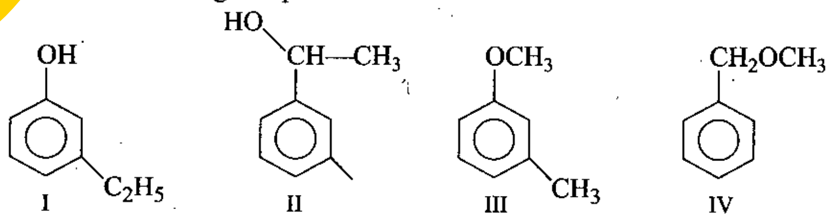
(a)  (b)  (c)  (d) 

41. The correct statements about the compound given below.



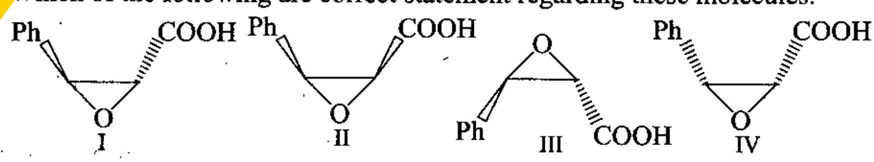
(a) Compound is optically active
(b) Compound possesses center of symmetry
(c) Compound possesses plane of symmetry
(d) Compound possesses axis of symmetry

42. Consider following compounds :



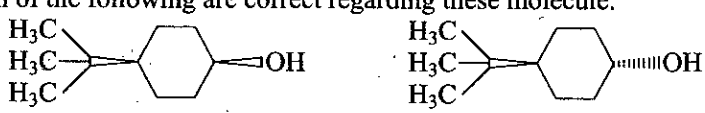
Choose the correct statements from the following.
(a) I, II and III are functional isomers
(b) I and II are position isomers
(c) III and IV are chain isomers
(d) III and IV are metamers

43. Which of the following are correct statement regarding these molecules.



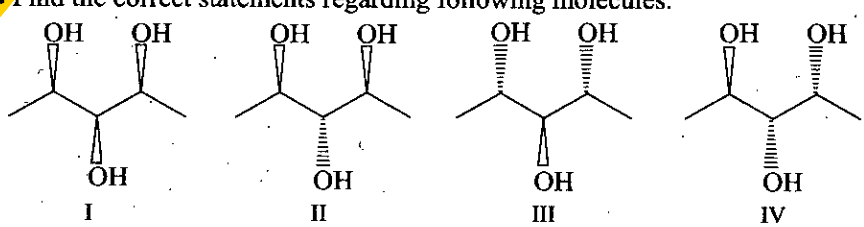
(a) Compound I and II are diastereomers
(b) Compound II and IV are enantiomers
(c) Compound I and III are enantiomers
(d) Compound III and IV are homomers

44. Which of the following are correct regarding these molecule.



(a) Both compounds contain plane of symmetry
(b) Both are enantiomers
(c) Both are diastereomers of each other
(d) Both are homomers

45. Find the correct statements regarding following molecules.



(a) I, II and III are meso
(b) II and III are enantiomers
(c) I and IV are diastereomers
(d) III and IV are diastereomers

EXERCISE-3 LINKED COMPREHENSION TYPE

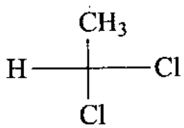
Passage-1

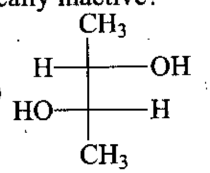
Presence of chiral center is not an essential condition to show optical isomerism. Essential condition is, compound should show non-superimposable mirror image.

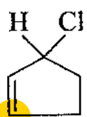
Allenes do not contain chiral center but show optical isomerism when different groups are attached on double bonded carbons.

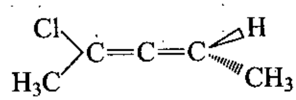
Biphenyls also show optical isomerism when both rings are perpendicular to each other and any ring should not contain plane of symmetry.

1. Which of the following compounds is optically inactive?

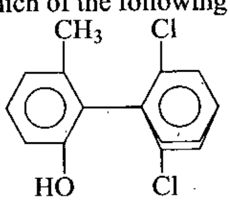
(a) 

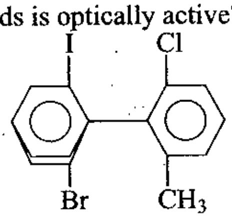
(b) 

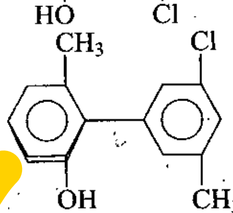
(c) 

(d) 

2. Which of the following biphenyl compounds is optically active?

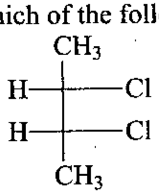
(a) 

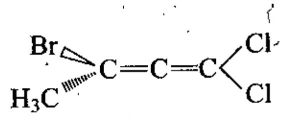
(b) 

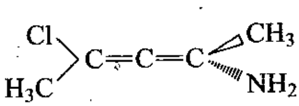
(c) 

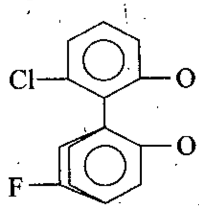
(d) All are correct

3. Which of the following compounds can be resolved in enantiomeric form?

(a) 

(b) 

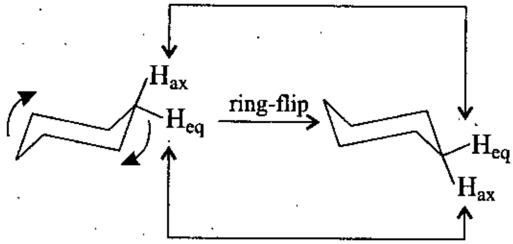
(c) 

(d) 

Passage-2

Cyclohexane exist as two chair conformations in rapid equilibrium at room temperature.

Each carbon atom on a cyclohexane ring has one axial and one equatorial hydrogen. Ring-flipping converts axial H's to equatorial H's and *vice-versa*.

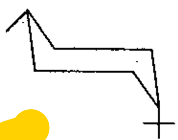
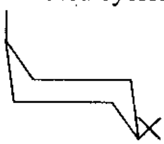
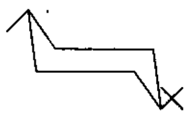
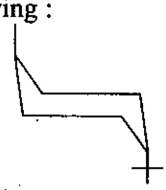


In substituted cyclohexane, groups larger than hydrogen are more stable in the equatorial position.

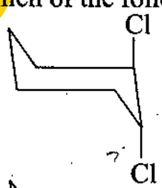
The *cis* isomer has two groups on the same side of the ring, either both up or both down.

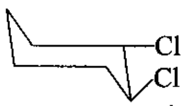
The *trans* isomer has two groups on opposite side of the ring one up and one down.

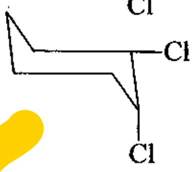
4. Find out most stable substituted cyclohexane among the following :

(a)  (b)  (c)  (d) 

5. Which of the following is most stable conformer of 1, 2-dichlorocyclohexane?

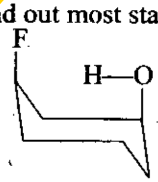
(a) 

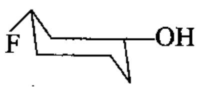
(b) 

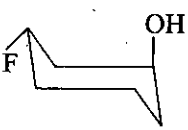
(c) 

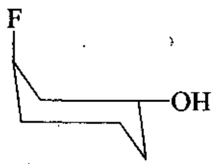
(d) All have equal stability

6. Find out most stable conformer of *cis*-3-fluorocyclohexanol :

(a) 

(b) 

(c) 

(d) 

Passage-3

Conformations are different arrangements of atoms that are interconverted by rotation about single bond.

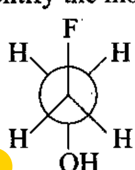
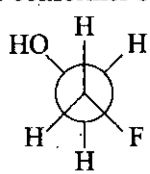
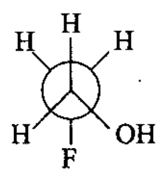
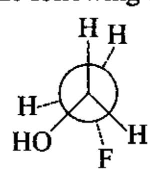
In eclipsed conformation, the C—H bond on one carbon is directly aligned with C—H bond on the adjacent carbon.

In staggered conformation, the C—H bond on one carbon bisect the H—C—H bond angle on adjacent carbon.

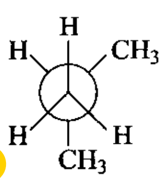
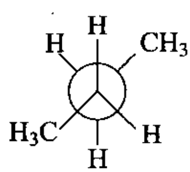
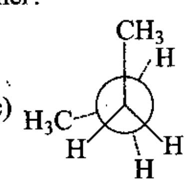
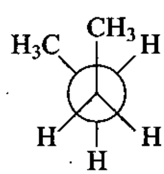
The angle that separates a bond on one atom from a bond on a adjacent atom is called a dihedral angle.

A staggered conformation with two larger groups 180° from each other is called anti. A staggered conformation with two larger group 60° from each other is called gauche.

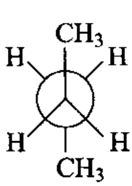
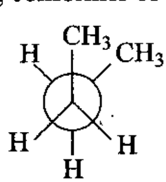
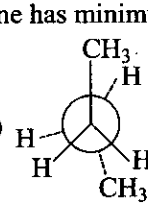
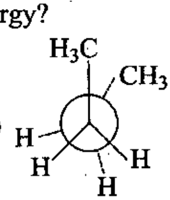
7. Identify the most stable conformer of 2-fluoro ethanol among the following :

(a)  (b)  (c)  (d) 

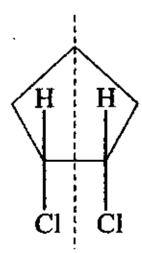
8. Which of the following is gauche conformer?

(a)  (b)  (c)  (d) 

9. Which of the following conformer of butane has minimum energy?

(a)  (b)  (c)  (d) 

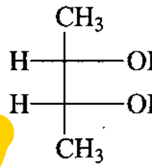
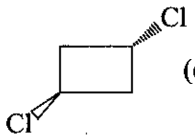
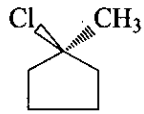
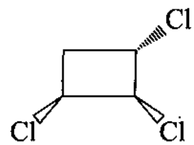
Passage-4



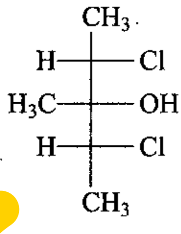
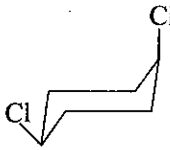
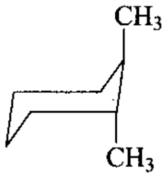
A line which bisects a compound in two equal parts and both parts appear to be the mirror image of each other, such kind of symmetry is known as plane of symmetry.

Any molecule that has a internal mirror plane of symmetry cannot be chiral, even though it may contain asymmetric carbon atoms.

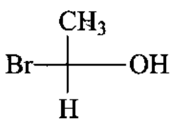
10. Which of the following compounds does not contain plane of symmetry?

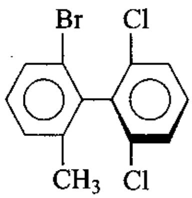
(a)  (b)  (c)  (d) 

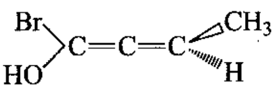
11. Which of the following compounds is optically active?

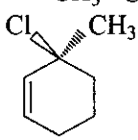
(a)  (b)  (c)  (d) 

12. Which of the following compounds is not chiral?

(a) 

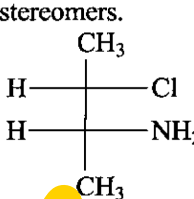
(b) 

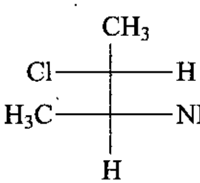
(c) 

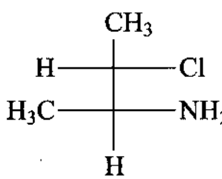
(d) 

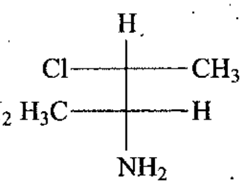
Passage-5

R, S-configuration is a useful tool for determination of enantiomers, diastereomers and homomers. If configuration of all chiral centers are opposite then structures are enantiomers, if all chiral centers have same configuration then they are homomers and if some have same configuration and some have opposite configuration then they are diastereomers.


I


II


III


IV

13. Among above structures find out enantiomeric structures :

(a) II and III (b) I and II, II and IV
(c) I and IV (d) III and IV

14. Find out homomers :

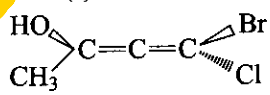
(a) I and III (b) II and IV (c) I and IV (d) III and IV

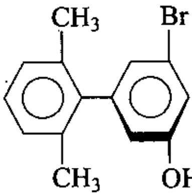
15. Which of the following is not diastereomer?

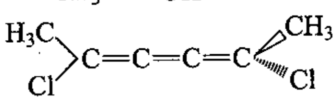
(a) I and III (b) II and III (c) III and IV (d) II and IV

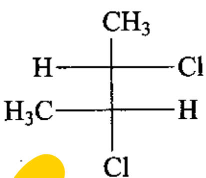
EXERCISE-4 MATRIX MATCH TYPE

1. Column (I)

(a) 

(b) 

(c) 

(d) 

Column (II)

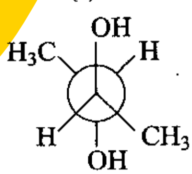
P. Plane of symmetry

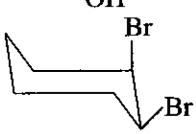
Q. Meso

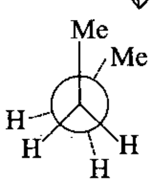
R. Optically active

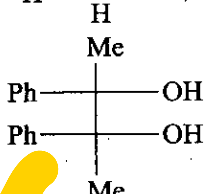
S. Geometrical isomerism

2. Column (I)

(a) 

(b) 

(c) 

(d) 

Column (II)

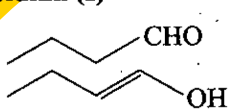
P. Meso

Q. *Anti* conformer

R. *Cis*-isomer

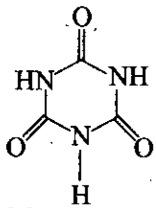
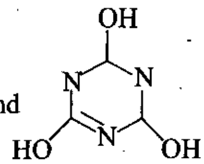
S. Eclipsed conformers

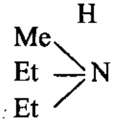
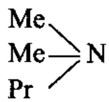
3. Column (I)

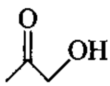
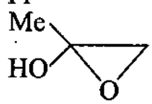
(a)  and

Column (II)

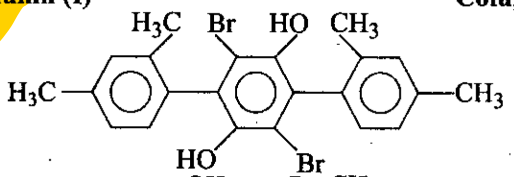
P. Ring chain tautomers

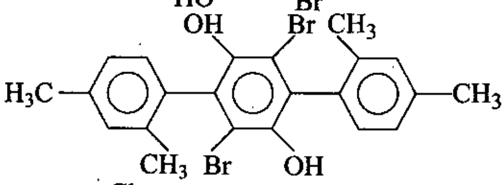
(b)  and  *Q*. Functional isomers

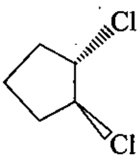
(c)  and  *R*. Tautomerism

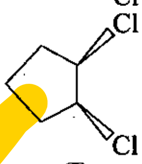
(d)  and  *S*. Metamerism

4. Column (I) **Column (II)**

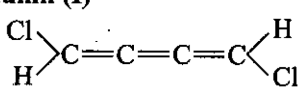
(a)  *P*. *Cis*-compound

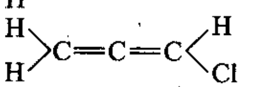
(b)  *Q*. *Trans*-compound

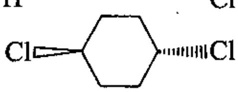
(c)  *R*. Optically active

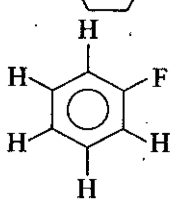
(d)  *S*. Optically inactive

5. Column (I) **Column (II)**

(a)  *P*. Polar molecule

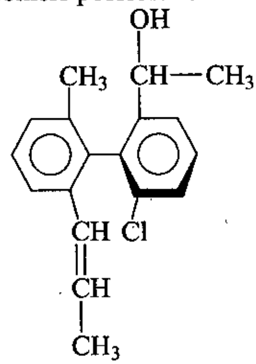
(b)  *Q*. Optically active

(c)  *R*. Optically inactive

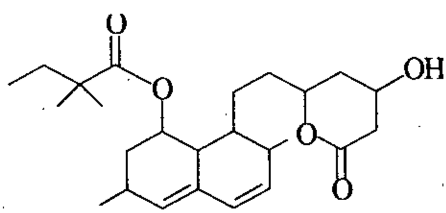
(d)  *S*. Symmetry element

EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

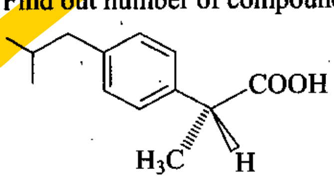
1. Total number of stereoisomers possible for the following compound is.

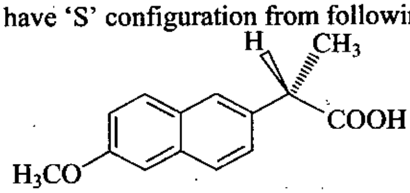


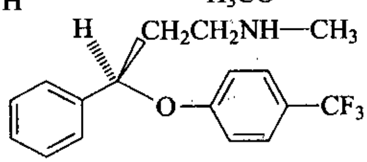
2. Find out number of stereogenic centers present in following compound 'simvastatin'

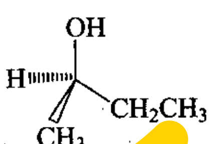


3. Find out number of compounds those have 'S' configuration from following.









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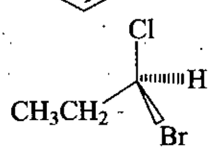

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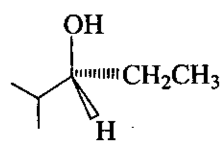

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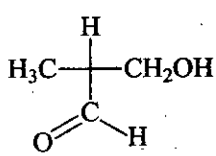
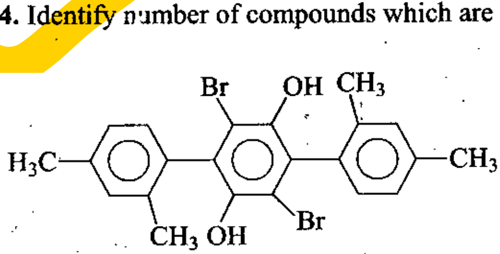


4. Identify number of compounds which are *meso*.



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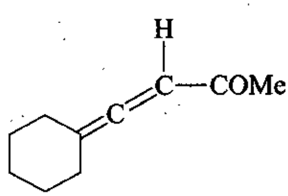

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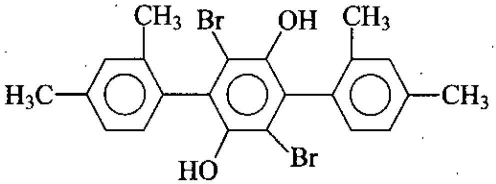
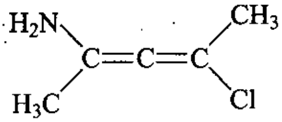
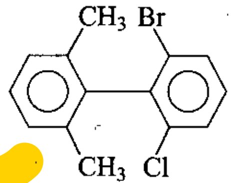
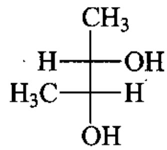
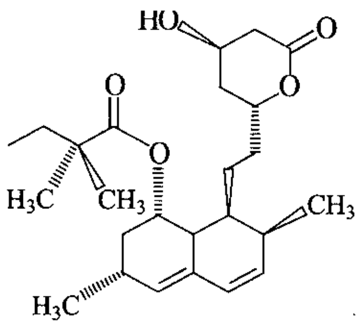
 ,  ,

 , 

5. Total number of stereoisomer possible for the compound

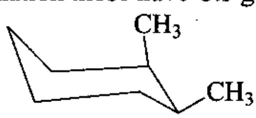
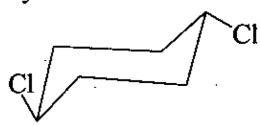
$$H_3C—CH=CH—CH=CH—CH=CH—Ph$$

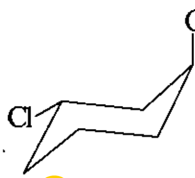
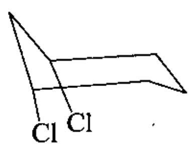
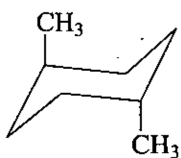
6. How many stereogenic centers have '*R*' configuration in following compound zocor.



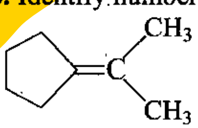
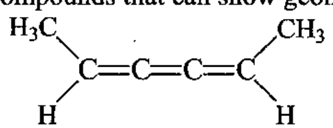
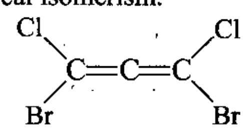
'ZOCOr'

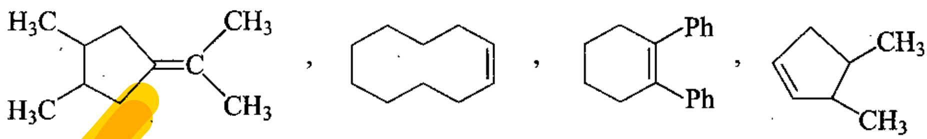
7. Find out number of conformation those have *Cis* geometry.

 ,  , 

 ,  , 

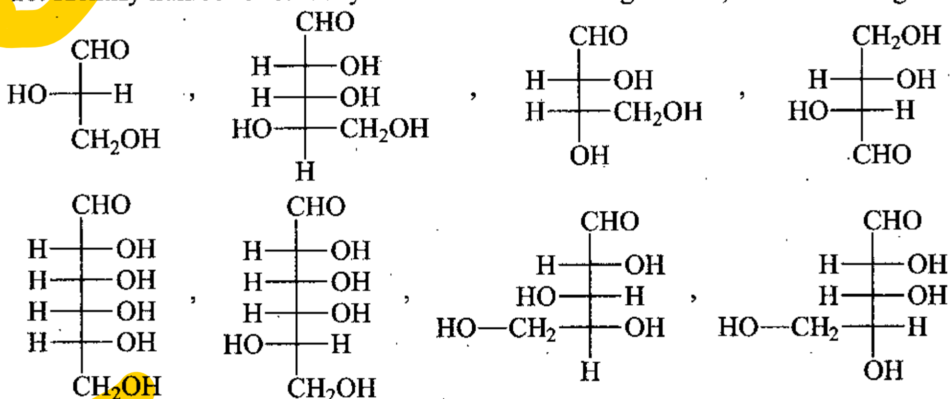
8. Identify number of compounds that can show geometrical isomerism.

 ,  , 

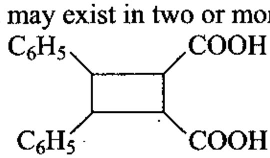


9. Find out number of structural isomers possible for C_6H_{14}.

10. Identify number of carbohydrate that have L-configuration , from following.



11. The following compound may exist in two or more stereoisomers



(a) Total number of stereoisomers.
(b) Number of enantiomeric pairs.
(c) Number of *meso* compounds.

12. "A pair of stereoisomer might be classified in various ways depending upon their exact nature"
How many following terms could properly be applied to a pair of stereoisomers, assuming their nature permits ?
(a) They might be *meso* isomers.
(b) They might be tautomers.
(c) They might be enantiomers.
(d) They might be diastereomers.
(e) They might be conformational isomers.
(f) They might be constitutional isomers.
(g) They might be configurational isomers.
(h) None of the above statements are true.

ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (b)	2. (c)	3. (c)	4. (c)	5. (c)	6. (b)	7. (c)	8. (b)	9. (a)	10. (c)
11. (d)	12. (d)	13. (a)	14. (d)	15. (b)	16. (d)	17. (d)	18. (d)	19. (d)	20. (d)
21. (b)	22. (c)	23. (c)	24. (d)	25. (c)	26. (c)	27. (c)	28. (a,c,d)		29. (b,c)
30. (a)	31. (c)	32. (c)	33. (c)	34. (c)	35. (a)	36. (d)	37. (d)	38. (d)	39. (d)
40. (a)	41. (a)	42. (c)	43. (a)	44. (a,c)	45. (c)	46. (a)	47 (b)	48. (b)	49. (b)
50. (d)									

Level-2

1. (d)	2. (c)	3. (d)	4. (a)	5. (c)	6. (b)	7. (a)	8. (c)	9. (d)	10. (c)
11. (b)	12. (c)	13. (d)	14. (d)	15. (b)	16. (b)	17. (d)	18. (d)	19. (a)	20. (c)
21. (b)	22. (c)	23. (a)	24. (d)	25. (b)	26. (d)	27. (c)	28. (b)	29. (b)	30. (c)
31. (c)	32. (b)	33. (c)	34. (b)	35. (d)	36. (b)	37. (b)	38. (c)	39. (b)	40. (c)
41. (b)	42. (d)	43. (d)	44. (d)	45. (b)	46. (c)	47. (d)	48. (b)	49. (d)	50. (b)
51. (b)	52. (d)	53. (c)	54. (d)	55. (b)					

Level-3

1. (a)	2. (d)	3. (a)	4. (a)	5. (b)	6. (a)	7. (b)	8. (c)	9. (a)	10. (b)
11. (a)	12. (d)	13. (c)	14. (c)	15. (b)	16. (d)	17. (d)	18. (a)	19. (a)	20. (b)
21. (b)	22. (d)	23. (c)	24. (a)	25. (b)	26. (d)	27. (d)	28. (d)	29. (c)	30. (a)
31. (d)	32. (b)	33. (d)	34. (a)	35. (c)	36. (b)	37. (a)	38. (b)	39. (c)	40. (b)
41. (d)	42. (c)	43. (c)	44. (d)	45. (d)	46. (c)	47. (a)	48. (d)	49. (a)	50. (a)
51. (b)	52. (b)	53. (c)	54. (a)	55. (d)	56. (c)	57. (c)	58. (b)	59. (b)	60. (a)
61. (b)	62. (b)	63. (d)	64. (d)	65. (b)	66. (b)	67. (c)	68. (a)	69. (a)	70. (b)
71. (b)	72. (d)	73. (a)	74. (c)	75. (d)	76. (d)	77. (b)	78. (a)	79. (d)	80. (b)
81. (c)	82. (b)	83. (a)	84. (c)	85. (d)	86. (b)	87. (c)	88. (b)	89. (a)	90. (b)
91. (c)	92. (d)	93. (d)	94. (c)	95. (b)	96. (b)	97. (b)	98. (a)	99. (c)	100. (d)
101. (b)	102. (c)	103. (a)	104. (a)	105. (d)	106. (c)	107. (d)	108. (b)	109. (c)	110. (a)
111. (b)	112. (a)	113. (b)	114. (b)	115. (d)	116. (a)	117. (c)	118. (b)	119. (d)	120. (b)
121. (c)	122. (d)	123. (b)	124. (b)	125. (c)					

Exercise-2 : More Than One Correct Answers

1. (a, b)	2. (b, d)	3. (a, b, c)	4. (a, c)	5. (a, b)	6. (a, b, d)
7. (c, d)	8. (a, d)	9. (b, c, d)	10. (a, b, c)	11. (a, b, c, d)	12. (b, d)
13. (a, c, d)	14. (a, b)	15. (a, b, c)	16. (a, c)	17. (a, d)	18. (a, b, d)
19. (a, b)	20. (a, b, c)	21. (b, c, d)	22. (a, b, d)	23. (a, c, d)	24. (a, b, c)
25. (a, b, c)	26. (a, b, c)	27. (a, b, c, d)	28. (a, b, c)	29. (b, c, d)	30. (a, b, c)
31. (a, b)	32. (a, c, d)	33. (a, c)	34. (a, b, d)	35. (a, b, d)	36. (a, c, d)
37. (b, c, d)	38. (a, b, d)	39. (a, c, d)	40. (b, c, d)	41. (a, d)	42. (a, d)
43. (a, b, c)	44. (a, c)	45. (a, c)			

Exercise-3 : Linked Comprehension Type

1. (a)	2. (b)	3. (c)	4. (c)	5. (b)	6. (a)	7. (c)	8. (d)	9. (a)	10. (d)
11. (c)	12. (b)	13. (b)	14. (c)	15. (d)					

Exercise-4 : Matrix Match Type

1. (a) → R;	(b) → P, Q;	(c) → P, Q, S;	(d) → P, Q
2. (a) → P, Q;	(b) → P, R;	(c) → P, S;	(d) → P, S
3. (a) → Q, R;	(b) → Q, R;	(c) → S;	(d) → P
4. (a) → P, R;	(b) → Q, S;	(c) → Q, R;	(d) → P, S
5. (a) → R, S;	(b) → P, R;	(c) → R, S;	(d) → P, R, S

Exercise-5 : Integer Answer Type Problems

1. (8)	2. (7)	3. (4)	4. (4)	5. (8)	6. (3)	7. (3)	8. (4)	9. (5)	10. (5)
11. (A - 10, B - 4, C - 2)	12. (5, A, C, D, E, G)								

❑❑❑

3 Hydrocarbons (Alkane, Alkene and Alkyne)

EXERCISE-1 ONLY ONE CORRECT ANSWER

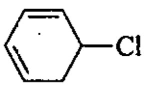
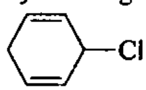
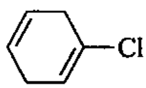
LEVEL-1

1. $B \xleftarrow[\text{Catalyst}]{\text{Lindlar's}} R-C\equiv C-R \xrightarrow{\text{Na/NH}_3} A$

   A and B are geometrical isomers ($R-CH=CH-R$) of which type ?

   (a) A is trans, B is *cis*
   (b) A and B both are *cis*
   (c) A and B both are *trans*
   (d) A is *cis*, B is *trans*

2. Which is most easily dehydrohalogenated ?

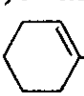
   (I)  (II)  (III) 

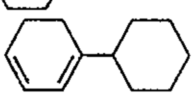
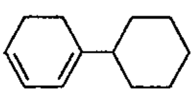
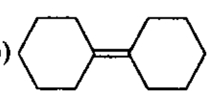
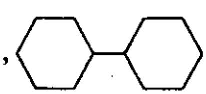
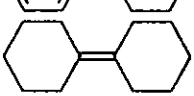
   (a) I
   (b) II
   (c) III
   (d) all with same case

3. The relative stability of the compounds given below is in the order.

   (I) $CH_3-C(CH_3)=C(CH_3)-CH_3$
   (II) $CH_3-C(CH_3)=CH-CH_3$
   (III) $CH_3-CH=CH_2$
   (IV) $CH_2=CH_2$

   (a) I > II > III > IV
   (b) IV > III > II > I
   (c) I > III > II > IV
   (d) II > I > IV > III

4. 2  $\xrightarrow{\text{conc. } H_2SO_4} A \xrightarrow{\text{Pt/H}_2} B$, A and B are :

   (a) , 
   (b) , 
   (c) , 
   (d) none

5. $CH_3-C(CH_3)=CH-C(CH_3)_2-CH_3 \xrightarrow[\text{KMnO}_4]{\text{NaIO}_4}$ Products

   The products are :

(a) $CH_3-\overset{\overset{O}{\|}}{C}-OH'(CH_3)_3C-COOH$

(b) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3,\ (CH_3)_3C-COOH$

(c) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3, (CH_3)_3C-CHO$

(d) None is correct

6. The compound formed when 2-butene is treated with hot alkaline $KMnO_4$ is :

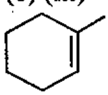
(a) Acetaldehyde (b) Acetic acid

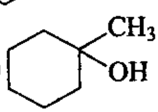
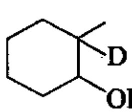
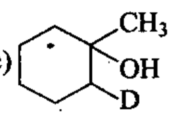
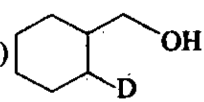
(c) $CH_2OH \cdot CH_2OH$ (d) $CH_3 \cdot CH_2 \cdot CO \cdot CH_3$

7. Relative stability among conjugated dienes (i), alkenes (ii), alkynes (iii) towards electrophilic addition reaction is in the order :

(a) (i) > (ii) > (iii) (b) (i) > (iii) > (ii)

(c) (iii) > (ii) > (i) (d) (ii) > (iii) > (i)

8.  $\xrightarrow[H_2O_2/OH]{BD_3/THF}$ Product A, A is :

(a)  (b)  (c)  (d) 

9. Arrange the following alkanols 1, 2 and 3 in order of their reactivity towards acid catalysed dehydration.

(1) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-\underset{\underset{OH}{|}}{CH_2}$ (2) $CH_3-\overset{\overset{OH}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-CH_3$

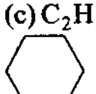
(3) $(CH_3)_2CH-\overset{\overset{OH}{|}}{CH}-CH_3$

(a) 1 > 2 > 3 (b) 2 > 1 > 3 (c) 2 > 3 > 1 (d) 3 > 2 > 1

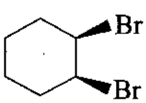
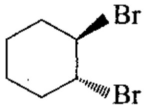
10. An organic liquid (A), containing C, H and O with the boiling point 78°C and possessing a rather pleasant odour, or heating with concentrated H_2SO_4 gives a gaseous product (B) with the empirical formula CH_2. (B) decolourises bromine water as well as alkaline $KMnO_4$ solution and takes up one mole of H_2 (per mole of B) in the presence of finely divided nickel at high temperature. (A) and (B) are :

(a) C_2H_5OH, C_2H_2 (b) CH_3OH, C_2H_5

(c) C_2H_5OH, C_2H_4 (d) $(CH_3)_2CHOH, C_3H_6$

11.  $+ Br_2 \longrightarrow A$

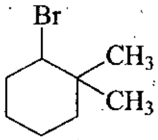
A will have configuration :

(a)  (b)  (c) both true (d) none is true

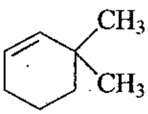
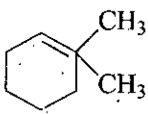
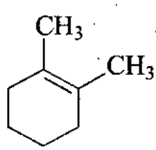
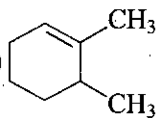
12. $CH_3CHO + HC{\equiv}CD \xrightarrow{CH_3ONa} P$ (major), P is :

(a) $CH_3-\underset{\displaystyle |}{\overset{\displaystyle OD}{CH}}-C{\equiv}CH$ (b) $CH_3-\overset{\displaystyle OH}{CH}-C{\equiv}CD$

(c) $CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-C{\equiv}CD$ (d) None of these

13.  $\xrightarrow{\text{alc. KOH}}$ Product.

The product can be :

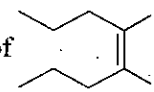
(a)  (b)  (c)  (d) 

14. Consider the following reaction.

$$CH_3-\underset{Br}{\overset{CH_3}{C}}-CH_2CH_3 \xrightarrow{\text{base}} (CH_3)_2C{=}C(CH_3)H \; (I) + CH_2{=}C(CH_2CH_3)(CH_3) \; (II)$$

Which of the following base will give the best yield of the alkene II as the major product ?

(a) CH_3O^- (b) $C_2H_5O^-$ (c) $(CH_3)_3CO^-$ (d) $(C_2H_5)_3CO^-$

15. IUPAC name of  is :

(a) 4, 5-Dimethyloct-4-ene (b) 3, 4-Dimethyloct-5-ene
(c) 4, 5-Dimethyloct-5-ene (d) None

16. $CH_3-\underset{OH}{CH}-CH_2-CH_3 \xrightarrow{\text{conc. } H_2SO_4}$ Product (I) + Product (II)

What is not true regarding the products ?

(a) Product-I and II are position isomers
(b) Product-I and II contains the same number of sp^3 and sp^2 carbon atoms
(c) The yield of the product I and II is same
(d) Reaction obeys Saytzeff rule

17. Which of the following is not true about geometrical isomers ?
(a) They have different physical properties
(b) The have different orientations in space
(c) They have different connectivity of atoms or groups
(d) They are non-interconvertible

18. 2-methyl propene is isomeric with But-1-ene. They can be distinguished by :
(a) Baeyer's reagent
(b) Ammonical $AgNO_3$
(c) Br_2 solution
(d) $O_3, Zn/H_2O$

19. Which of the following is the structure of propylene chlorohydrin ?
(a) $CH_3-\underset{\underset{Cl}{|}}{CH}-\underset{\underset{OH}{|}}{CH_2}$
(b) $\underset{\underset{Cl}{|}}{CH_2}-CH_2-\underset{\underset{OH}{|}}{CH_2}$
(c) $CH_3-\underset{\underset{OH}{|}}{C}-CH_3$
(d) $CH_3-\underset{\underset{OH}{|}}{CH}-\underset{\underset{Cl}{|}}{CH_2}$

20. Which alkene on oxidation with acidic $KMnO_4$ gives only acetic acid ?
(a) $CH_3=CH-CH_3$
(b) $CH_3-CH=CH-CH_3$
(c) Ethylene
(d) Pentene - 2

21. Ethylene reacts with osmium tetroxide to form an osmic ester which on hydrolysis gives :
(a) Ethyl alcohol + Osmic acid
(b) Glyoxal + Osmic acid
(c) Ethylene glycol + H_2OsO_4
(d) Glycollic acid + H_2OsO_4

22. Diborane reacts with terminal alkenes to form trialkylboranes. These react with alkaline hydrogen peroxide to form :
(a) Secondary alcohols
(b) Tertiary alcohols
(c) Isobutyl alcohol
(d) Primary alcohols

23. Kharasch effect operates in which of the following ?
(a) $CH_3CH_2CH=CH_2 + HCl$
(b) $CH_3CH_2-CH=CH_2 + HBr$
(c) $CH_3CH=CH-CH_3 + HBr$
(d) $CH_3CH_2CH=CH_2 + HI$

24. A hydrocarbon X adds on one mole of hydrogen to gives another hydrocarbon and also decolourises bromine water. X reacts with $KMnO_4$ in presence of acid to give two moles of the same carboxylic acid. The structure of X is :
(a) $CH_3CH=CH\cdot CH_2CH_2CH_3$
(b) $CH_3CH_2CH=CHCH_2CH_3$
(c) $CH_3CH_2CH_2-CH=CHCH_3$
(d) $CH_2=CH-CH_2CH_2CH_3$

25. Identify Z in the sequence

$$CH_3-CH_2-CH=CH_2 \xrightarrow{HBr/H_2O_2} Y \xrightarrow{C_2H_5O^-Na^+} Z$$

(a) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-O-CH_2-CH_3$

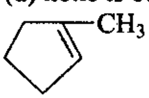
(b) $CH_3-CH_2-\underset{\underset{CH_3}{|}}{CH}-O-CH_2-CH_3$

(c) $CH_3-(CH_2)_3-O-CH_2-CH_3$
(d) $CH_3-(CH_2)_4-O-CH_3$

26. $CH_3-CH=CH_2 \xrightarrow[H_2O_2/OH^-]{BD_3}$ product X, X is :

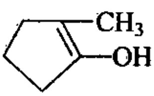
(a) $CH_3-\underset{\large OH}{\underset{|}{CH}}-CH_2D$
(b) $CH_3-\underset{\large D}{\underset{|}{CH}}-CH_2OH$
(c) $CH_3-\underset{\large OD}{\underset{|}{CH}}-CH_3$
(d) none is correct

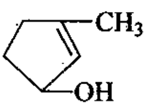
27. $CH_2=CH-CH=CH_2 \xrightarrow{CCl_3Br}$ product. The major product is :
(a) $Br-CH_2-CH=CH-CH_2-CCl_3$
(b) $CH_2=CH-\underset{\large Br}{\underset{|}{CH}}-CH_2-CCl_3$
(c) $CH_2=CH-\underset{\large CCl_3}{\underset{|}{CH}}-CH_2-Br$
(d) none is correct

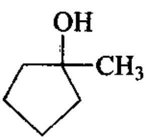
28. 

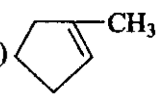
$\xrightarrow[(2)\ NaBH_4/NaOH/H_2O]{(1)\ Hg(OAc)_2/H_2O/THF}$ A.

A is :

(a) 

(b) 

(c) 

(d) 

29. 2-Phenylpropene on acidic hydration gives :
(a) 2-Phenyl-2-propanol
(b) 2-Phenyl-1-propanol
(c) 3-Phenyl-1-propanol
(d) 1-Phenyl-2-propanol

30. *cis*-2-Butene on reaction with Br_2 in CCl_4 produces mainly :
(a) 1-bromo-2-butene
(b) 2, 3-dibromobutane
(c) meso-2, 3-dibromobutane
(d) (±) 2, 3-dibromobutane

31. Which of the following reaction will lead to the creation of two chiral centres in the product ?

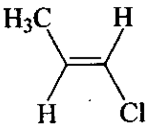
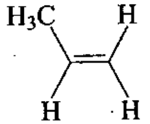
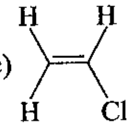
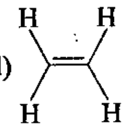
(a) $CH_3CH=CHCH_3 + Br_2 \xrightarrow{CCl_4}$
(b) $CH_3CH_2CH=CH_2 + Br_2 \xrightarrow{CCl_4}$
(c) $CH_3CH=CHCH_3 + HBr \longrightarrow$
(d) $CH_3CH_2CH=CH_2 + HBr \longrightarrow$

32. The reaction of ethylene with Br_2 in water in the presence of NaCl gives :
(a) 1, 2-dibromoethane
(b) 2-bromoethanol
(c) 1-bromo-2-chloroethane
(d) all of these

33. A hydrocarbon C_8H_{14} consumes only one mole of H_2 on catalytic hydrogenation. The hydrocarbon when heated with hot and concentrated alkaline $KMnO_4$ gives cyclohexanone and acetic acid (after acidification). The hydrocarbon is :

(a) 1-ethylcyclohexene (b) 1, 2-dimethylcyclohexene
(c) ethylidenecyclohexane (d) cyclohexylethene

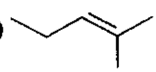
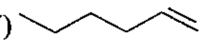
34. Dipole moment of which compound will be maximum ?

(a)  (b)  (c)  (d) 

35. Correct order of reactivity towards electrophilic addition reactions is :

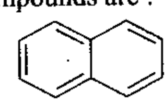
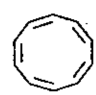
(a) $CH_2=CH_2 > CH_3—CH=CH_2 > (CH_3)_2C=CH_2$
(b) $CH_2=CH_2 > CH_3—CH=CH_2 < (CH_3)_2C=CH_2$
(c) $CH_2=CH_2 < (CH_3)_2C=CH_2 < CH_3—CH=CH_2$
(d) $CH_3—CH=CH_2 < CH_2=CH_2 < (CH_3)_2C=CH_2$

36. Rank the following in order of stability (lowest to highest).

(I)  (II) 
(III)  (IV) 

(a) IV < II < III < I (b) IV < III < II < I
(c) I < III < II < IV (d) IV < II = III < I

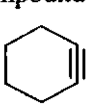
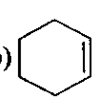
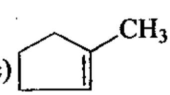
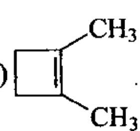
37. The following two compounds are :

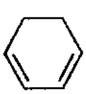
 

(I) (II)

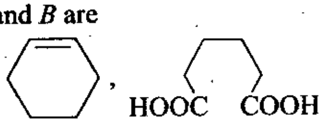
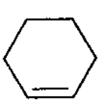
(a) identical (b) conformational isomers
(c) geometrical isomers (d) structural isomers

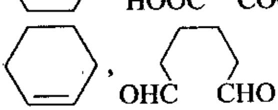
38. Compound (A) on oxidation with $OsO_4/NaIO_4$ gives hexanedial. Structure of compound (A) will be :

(a)  (b)  (c)  (d) 

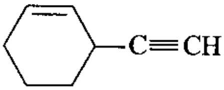
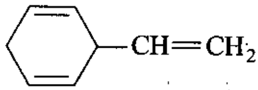
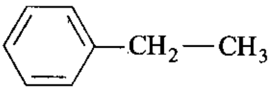
39.  $\xrightarrow[\text{1 eqiv.}]{H_2} A \xrightarrow{O_3/H_2O} B.$

A and B are

(a)  (b) , not formed

(c)  (d) none is correct

40. Index of unsaturation (H-deficiency) of C_8H_{10} is ... and if it has a six-membered ring, it can be :

(a) 4, 
(b) 4, 
(c) 4, 
(d) All correct

41. Which of the following yields But-2-ene on dehydration with conc. H_2So_4 ?

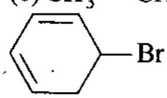
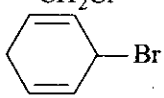
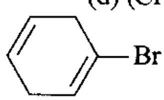
(a) 2-Methyl-2-butanol
(b) 2-Propanol
(c) 2-Methyl-2-propanol
(d) Secondary butyl alcohol

42. An alcohol (A) on dehydration gives (B), which on Ozonolysis gives acetone and formaldehyde. (B) decolourises alkaline $KMnO_4$ solution but (A) does not. (A) and (B) are respectively :

(a) $CH_3CH_2CH_2CH_2OH$ and $CH_3CH_2CH{=}CH_2$
(b) $CH_2CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_3$ and $CH_3—CH{=}CH—CH_3$
(d) $(CH_3)_3C—OH$ and $(CH_3)_2C{=}CH_2$
(c) $CH_3—CH_2—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_3$ and $(CH_3)_2C{=}CH_2$

43. Which of the following compound undergoes dehydrochlorination most easily when treated with alcoholic KOH ?

(a) $CH_3—\underset{\displaystyle CH_3}{\underset{|}{CH}}—CH_2Cl$
(b) $CH_3—\underset{\displaystyle Cl}{\underset{|}{CH}}—C_2H_5$
(c) $CH_3—CH_2—CH_2Cl$
(d) $(CH_3)_3C—Cl$

44.   

(I) (II) (III)

Which is most easily dehydrohalogenated ?

(a) I
(b) II
(c) III
(d) all with same case

45. Cyclohexene on reaction with OsO_4 followed by reaction with $NaHSO_3$ gives :

(a) *cis*-diol (b) *trans*-diol (c) epoxy (d) alcohol

46. Among the following incorrect statement (s) is/are :

(a) In alkens the boiling point increases with a rise in molecular mass.
(b) Branching in an alkane decreases the boiling point.
(c) Boiling point of an odd numbered carbon atoms alkane is lower than both of its even numbered neighbours.
(d) Melting point of an odd numbered carbon atoms alkane is lower than next even numbered neighbours.

47. Ethylene reacts with Br_2 to give 1, 2-dibromoethane. The anti-addition takes place due to the formation of which intermediate ?

(a) $CH_2Br—\overset{+}{C}H_2$ (b) $CH_2—CH_2$ (bridged by $\overset{+}{Br}$) (c) $BrCH{=}CH^+$ (d) $CH_2—CHBr$ (bridged by $\overset{+}{Br}$)

48. Which of the following reactions will result in the formation of a chiral centre in the product ?

(a) $CH_3CH{=}CH_2 + HBr \longrightarrow$ (b) $CH_2{=}CH_2 + HOBr \longrightarrow$

(c) $CH_3CH_2CH{=}CH_2 + HBr \xrightarrow{H_2O_2}$ (d) $CH_3CH_2CH{=}CH_2 + HBr \longrightarrow$

49. One mole of a hydrocarbon on ozonolysis yields one mole of glyoxal and two moles of formaldehyde. The hydrocarbon is :

(a) $CH_2{=}\underset{CH_3}{\underset{|}{C}}—\underset{CH_3}{\underset{|}{C}}{=}CH_2$ (b) $CH_2{=}CH—CH{=}CH_2$

(c) $CH_2{=}CH—CH_2—CH{=}CH_2$ (d) $CH_3CH{=}C{=}CH_2$

50. A hydrocarbon (*A*) on chlorination gives (*B*), which on reacting with alcoholic KOH changes into another hydrocarbon (*C*). The latter decolorizes Baeyer's reagent and on ozonolysis forms formaldehyde only (*A*) is :

(a) Methane (b) Ethene (c) Ethane (d) Butane

LEVEL-2

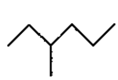
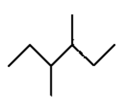
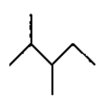
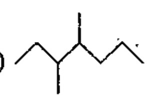
Alkane

1. The smallest alkane which can show optical isomerism possesses :

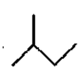
(a) 5 carbon (b) 6 carbon

(c) 7 carbon (d) 8 carbon

2. Which of the following alkanes has a *meso* stereoisomers?

(a)  (b)  (c)  (d) 

3. Among the following, the compound which has highest boiling point is :

(a)  (b)  (c)  (d) 

4. Propane can be best prepared by the reaction :

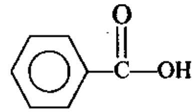
(a) $CH_3CH_2I + CH_3I + Na \xrightarrow{Et_2O}$

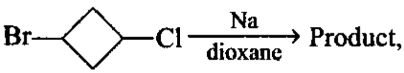
(b) $CH_3CH_2COONa + CH_3COONa \xrightarrow[\text{Electrolysis}]{H_2O}$

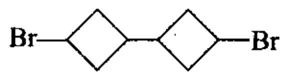
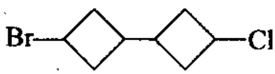
(c) $CH_3CH_2Br + (CH_3)_2\,CuLi \xrightarrow{Et_2O}$

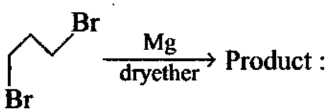
(d) $CH_3CH_2CH_2COONa \xrightarrow[\text{CaO, }\Delta]{NaOH}$

5. Me_3CMgCl on reaction with D_2O produces :
(a) Me_3CD (b) Me_3COD (c) $(CD_3)_3CD$ (d) $(CD_3)_3COD$

6. Which of the following carboxylic acids undergoes decarboxylation most easily on heating?
(a) CH_3CH_2COOH
(b) $CH_3—\overset{\overset{\large O}{\|}}{C}—COOH$
(c) $CH_3—\overset{\overset{\large O}{\|}}{C}—CH_2—\overset{\overset{\large O}{\|}}{C}—OH$
(d) 

7. 

find the product :
(a) 
(b) 
(c) 
(d) 

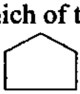
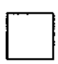
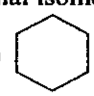
8. 

(a) 
(b) 
(c) $CH_3—CH{=}CH_2$
(d) 

9. Which of the following alkyl bromides may be used for the synthesis of 2, 3-dimethyl butane by Wurtz reaction?
(a) 
(b) 
(c) Isobutyl bromide
(d) *s*-butyl bromide

10. Which of the following methods of alkane synthesis involves the electrochemical oxidation of alkanoate ion?
(a) Kolbe's method
(b) Wurtz method
(c) Frankland method
(d) Corey-House method

11. The reactivity of alkyl halides for Wurtz reaction is :
(a) $1° > 2° > 3°$ (b) $3° > 2° > 1°$ (c) $2° > 3° > 1°$ (d) $1° > 3° > 2°$

12. Which of the following is planar and cannot form conformational isomer?
(a)  (b)  (c)  (d) 

13. Which of the following reactions has zero activation energy?
(a) $CH_4 + Cl^\bullet \longrightarrow \dot{C}H_3 + HCl$ (b) $Cl—Cl \xrightarrow{h\nu} 2Cl^\bullet$

(c) $CH_3^{\bullet} + {}^{\bullet}CH_3 \longrightarrow CH_3—CH_3$

(d) $CH_3^{\bullet} + Cl—Cl \longrightarrow CH_3—Cl + Cl^{\bullet}$

14. Photochemical fluorination is explosive while iodination is too slow to occur. The reason for this is :

(a) bond dissociation energy of I_2 is minimum.
(b) formation of $CH_3—F$ is most exothermic.
(c) formation of H—F is most exothermic while formation of HI is endothermic.
(d) F_2 has lower bond dissociation energy than Cl_2 and Br_2.

15. Which statement is incorrect about free radical halogenation of alkanes?

(a) The number of product molecules formed by one photon is very high
(b) If O_2 is added, initially the rate of reaction decreases, then it increases
(c) Inhibitors combine with free radical and terminate the chain reaction
(d) Presence of $Ph—\underset{\underset{O}{\|}}{C}—O—O—\underset{\underset{O}{\|}}{C}—Ph$ inhibit the free radical reaction.

16. Which of the following is not the chain propagation step in the chlorination of alkane?

(a) $R^{\bullet} + SO_2Cl_2 \longrightarrow$
(b) ${}^{\bullet}SO_2Cl \longrightarrow SO_2 + Cl^{\bullet}$
(c) $Cl^{\bullet} + R—H \longrightarrow$
(d) $R—O—O—R + 2R—H \longrightarrow 2ROH + 2R^{\bullet}$

17. An alkane cannot be chlorinated by using which of the following reagents?

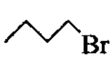
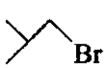
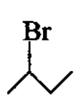
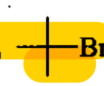
(a) Cl_2/hv (b) HCl (c) SO_2Cl_2 (d) t-Bu—O—Cl

18. The correct order of heat of combustion of the following hydrocarbon is :

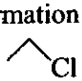
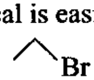
Pent-1-ene	Pentane	neopentane	isopentane
(P)	(Q)	(R)	(S)

(a) $P > Q > R > S$ (b) $Q > S > R > P$
(c) $P > Q > S > R$ (d) $S > R > Q > P$

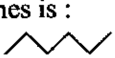
19. Formation of free radical takes place with absorption of minimum energy in the formation of :

(a)  (b)  (c)  (d) 

20. Formation of free radical is easiest in :

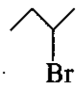
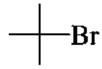
(a)  (b)  (c)  (d) 

21. The correct order of relative density of following alkanes is :

 (P)  (Q)  (R)  (S)

(a) $P > S > Q > R$ (b) $R > S > Q > P$ (c) $R > Q > S > P$ (d) $S > R > Q > P$

22. What is the chief product obtained when *n*-butane is treated with Br_2 in the presence of light at 130°C?

(a)  (b)  (c)  (d) 

23. The number of possible enantiomeric pairs that can be produced during monochlorination of 2-methyl butane is :

(a) 3 (b) 4 (c) 2 (d) 1

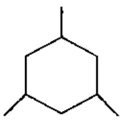
24. For the given reaction how many products will obtain (all isomers)?

 $\xrightarrow{Br_2/h\nu}$ Products

(a) 1 (b) 6 (c) 4 (d) 3

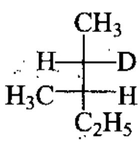
25. How many total products will be obtained by monochlorination of 2-methyl butane and how many can be separated by fractional distillation?

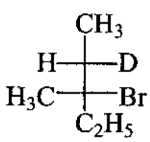
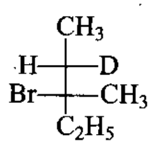
(a) 6, 4 (b) 5, 4 (c) 6, 2 (d) 4, 2

26.  $\xrightarrow{Br_2/h\nu}$ Products,

How many monobrominated products will be obtained by above reaction?

(a) 6 (b) 4 (c) 5 (d) 3

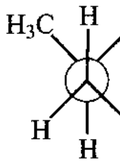
27.  $\xrightarrow{Br_2/h\nu}$ Products :

(a)  (b)  (c) Both (a) and (b) (d) None of these

28. $$H_3C-\overset{\displaystyle CH_3}{\underset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-H + CCl_4 \xrightarrow[h\nu]{R_2O_2} \text{Product :}$$

(a) $H_3C-\overset{\displaystyle CH_3}{\underset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-Cl$ (b) $CHCl_3$

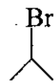
(c) Both (a) and (b) (d) None of these

29.  $\xrightarrow{Br_2,\ h\nu}$ Product :

(a) $H_3C-\underset{\underset{H}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2Br$

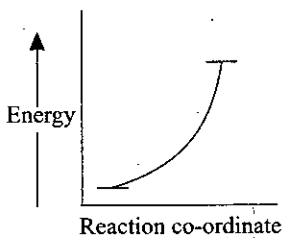
(b) $CH_3-\underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$

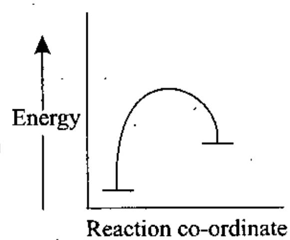
(c) 

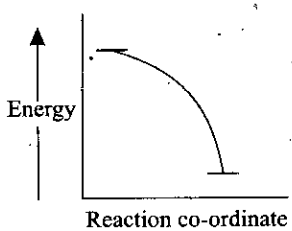
(d) 

30. How many alkane of molecular weight 100 are chiral?
(a) 1 (b) 2 (c) 3 (d) 4

31. Which one is the correct energy profile for $Cl^{\bullet} + Cl^{\bullet} \longrightarrow Cl_2$?

(a) 

(b) 

(c) 

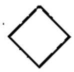
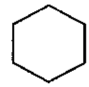
(d) All of these

32. Which of the following is the correct statement regarding relative acidic character of cyclopropane and propane?
(a) Cyclopropane is more acidic than propane
(b) Propane is more acidic than cyclopropane
(c) Both are equally acidic
(d) Both are neutral

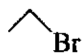
33. $Ph-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_3 \xrightarrow[h\nu]{Cl_2}$ Products $\xrightarrow[\text{Distillation}]{\text{Fractional}}$ Fractions,

No. of products and no. of fractions are respectively :
(a) 6, 5 (b) 6, 4 (c) 5, 4 (d) 6, 3

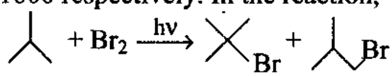
34. Which of the following cycloalkanes has lowest heat of combustion per —CH_2— group per mole?

(a)  (b)  (c)  (d) 

35. Which of the following alkyl halides is not suitable for Corey-House synthesis of alkanes?

(a) CH_3I (b)  (c)  (d) 

36. The relative reactivity of 1°H, 2°H and 3°H in bromination reaction has been found to be 1 : 82 : 1600 respectively. In the reaction,

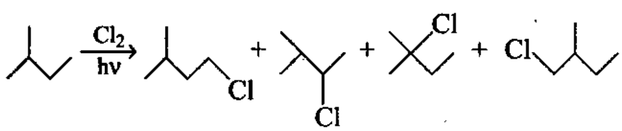


(A) (B)

The percentage yield of (*A*) and (*B*) are expected to be :

(a) 99.4%, 0.6% (b) 50%, 50%
(c) 0.6%, 99.4% (d) 80%, 20%

37. The relative reactivity of 1°, 2° and 3° hydrogens in chlorination reaction has been found to be 1 : 3.8 : 5. In the reaction,



(A) (B) (C) (D)

The ratio of the amount of the product (*A*), (*B*), (*C*) and (*D*) is expected to be :

(a) 1 : 3.8 : 5 : 1 (b) 3 : 7.6 : 5 : 6
(c) 3 : 7.6 : 5 : 3 (d) 1 : 7.6 : 5 : 1

38. Which of the following is the free radical chain reaction?

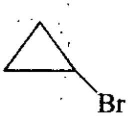
(a) $2CH_3I + 2Na \longrightarrow CH_3{-}CH_3 + 2NaI$

(b) $CH_4 + Cl_2 \xrightarrow{h\nu} CH_3Cl + HCl$

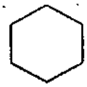
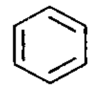
(c) $2CH_3CO\overset{\ominus}{O}\overset{\oplus}{Na} \xrightarrow{\Delta} CH_3{-}CH_3 + 2CO_2 + 2NaOH + H_2$

(d) All of the above

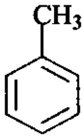
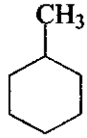
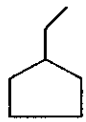
39.  + HBr $\longrightarrow$ Product :

(a)  (b)  (c)  (d) 

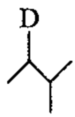
40.  $\xrightarrow[600°C]{Cr_2O_3—Al_2O_3}$ Major product :

(a)  (b)  (c)  (d) 

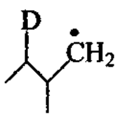
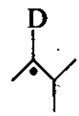
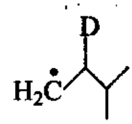
41.  $\xrightarrow[600°C]{Cr_2O_3—Al_2O_3}$ Major product :

(a)  (b)  (c)  (d) 

42. Consider the following reaction :

 + Br$^{\bullet}$ ⟶ X + HBr

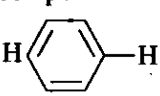
Identify structure of (X) among following :

(a)  (b)  (c)  (d) 

43.  $\xrightarrow[100°C]{Na/EtOH}$ Product :

(a)  (b) 
(c)  (d) $H_2C=C=CH_2$

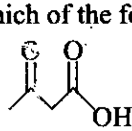
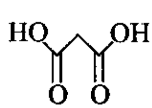
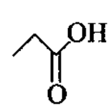
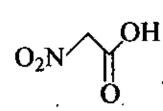
44. The bond dissociation energy of the C—H bond for the compound

$H_3C—H$ (P) $H_3C—CH_2—H$ (Q) $H_2C=CH—CH_2—H$ (R)  (S)

decreases in the order :

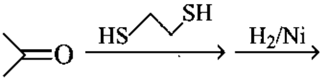
(a) $P > Q > R > S$ (b) $S > R > Q > P$
(c) $S > P > Q > R$ (d) $Q > P > S > R$

45. Which of the following carboxylic acids is difficult to decarboxylate?

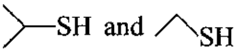
(a)  (b)  (c)  (d) 

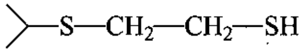
46. The method of estimation of active hydrogen in a compound by reaction with CH_3MgI is known as :

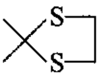
(a) Zerewitinoff method (b) Hinsberg method
(c) Zeisel method (d) Victor Meyer's method

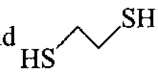
47. 

The end products of the reactions are :

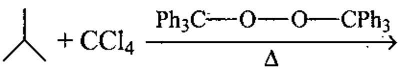
(a) 

(b) 

(c)  and H_2O

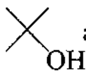
(d)  and 

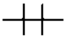
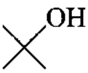
48. Consider the following reaction :



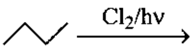
The major products formed in this reaction are :

(a)  and $CHCl_3$

(b)  and CH_3Cl

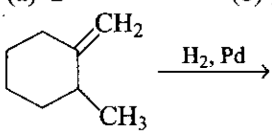
(c)  and 

(d) No reaction

49. 

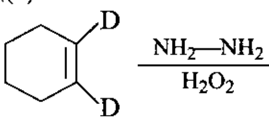
Find out number of monochlorinated products (including stereoisomers) which are possible in the above reaction :

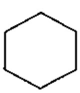
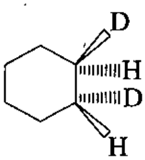
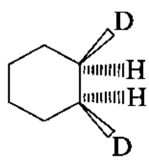
(a) 2 (b) 3 (c) 4 (d) 5

50. 

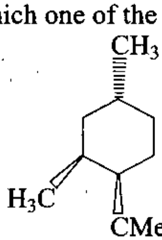
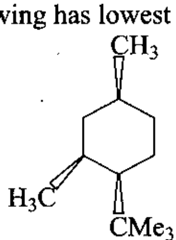
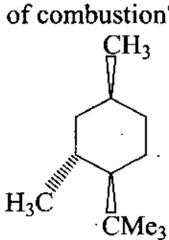
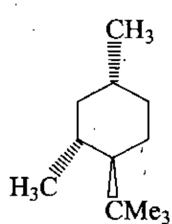
Products of the above reaction will be :

(a) racemic mixture (b) diastereomers
(c) meso (d) structural isomer

51.  Product :

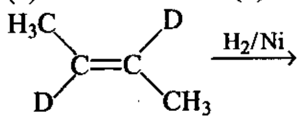
(a)  (b)  (c)  (d) Both (b) and (c)

52. Which one of the following has lowest heat of combustion?

(a)  (b)  (c)  (d) 

53. On catalytic reduction with H_2/Pt how many alkenes will give *n*-butane?

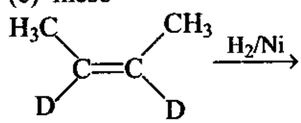
(a) 1 (b) 2 (c) 3 (d) 4

54. 

Product of above reaction will be :

(a) racemic mixture (b) diastereomers

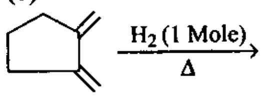
(c) meso (d) constitutional isomers

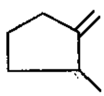
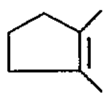
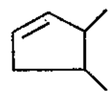
55. 

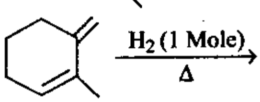
Product of above reaction will be :

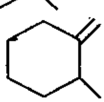
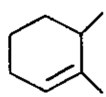
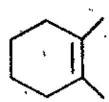
(a) racemic mixture (b) diastereomers

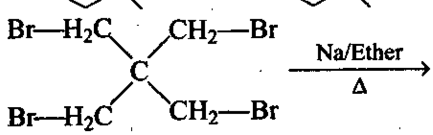
(c) meso (d) constitutional isomers

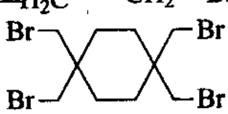
56.  Product :

(a)  (b)  (c)  (d) None of these

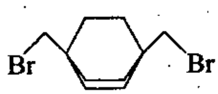
57.  Product :

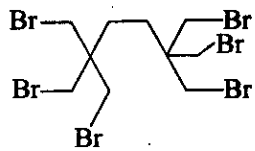
(a)  (b)  (c)  (d) None of these

58.  Major product :

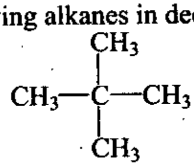
(a) 

(b) 

(c) 

(d) 

59. Arrange the following alkanes in decreasing order of their heat of combustion :

(X) (Y) (Z)

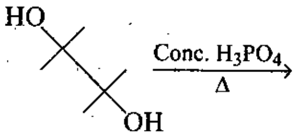
(a) $X > Y > Z$ (b) $Z > X > Y$ (c) $Z > Y > X$ (d) $X > Z > Y$

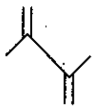
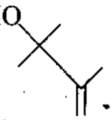
Alkene and Alkyne

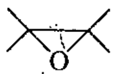
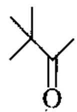
60. Which of the following is the major product when 1-butanol is heated with concentrated H_2SO_4?

(a) 1-butene (b) *Cis*-2-butene

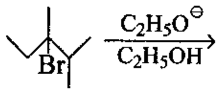
(c) *Trans*-2-butene (d) All of these

61. 

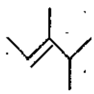
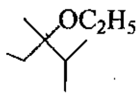
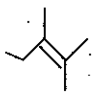
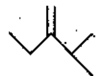
(a)  (b) 

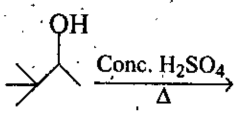
(c)  (d) 

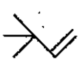
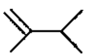
62. In the reaction

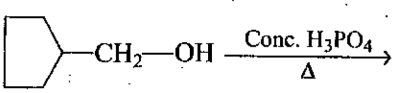


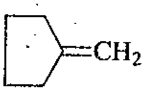
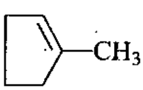
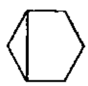
The major product obtained is :

(a)  (b)  (c)  (d) 

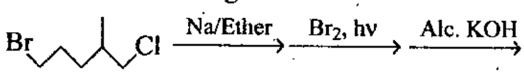
63.  Major product :

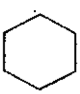
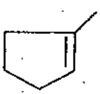
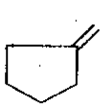
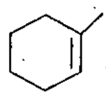
(a)  (b)  (c)  (d) None of these

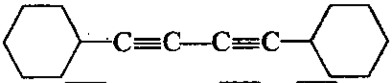
64.  Major product :

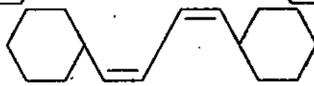
(a)  (b)  (c)  (d) 

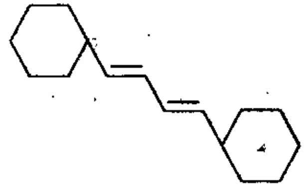
65. The major product of the following reaction is :



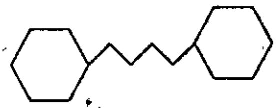
(a)  (b)  (c)  (d) 

66.  $\xrightarrow{Li/NH_3\,(l)}$ Product :

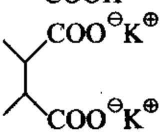
(a) 

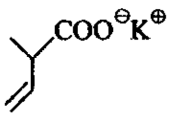
(b) 

(c) Both (a) and (b)

(d) 

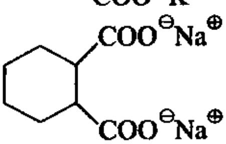
67. $CH_3—\underset{\displaystyle COOH}{\underset{|}{CH}}—\overset{\displaystyle COOH}{\overset{|}{C}H}—CH_3 \xrightarrow[\text{Electrolysis}]{\text{KOH}}$ Product :

(a) 

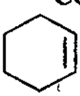
(b) 

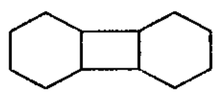
(c) 

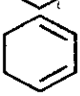
(d) 

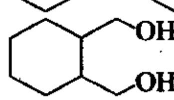
68. 

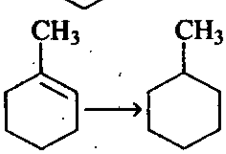
$\xrightarrow{\text{Electrolysis}}$ Major product :

(a) 

(b) 

(c) 

(d) 

69. 

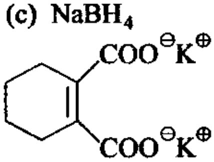
reagent used for the reaction :

(a) $LiAlH_4$

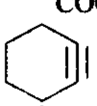
(b) H_2/Ni

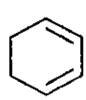
(c) $NaBH_4$

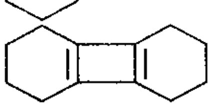
(d) H_2, Pd—$BaSO_4$

70. 

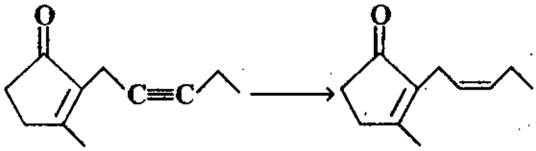
$\xrightarrow{\text{Electrolysis}}$ Product :

(a) 

(b) 

(c) 

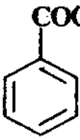
(d) None of these

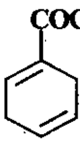
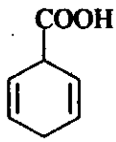
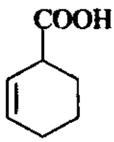
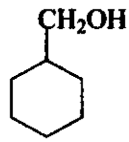
71. 

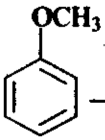
Which reagent will be used for the above conversion?

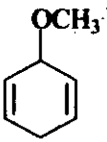
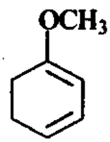
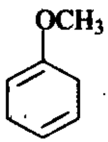
(a) $Na/Liq. NH_3$ (b) H_2, Pd—$CaCO_3$

(c) Li, Ph—NH_2 (d) H_2, Pt

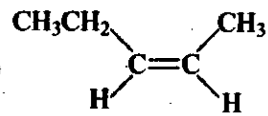
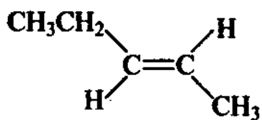
72.  $\xrightarrow{\text{Li, Liq. NH}_3}$ Major product :

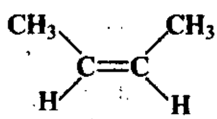
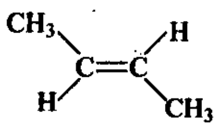
(a)  (b)  (c)  (d) 

73.  $\xrightarrow{\text{Na, Liq. NH}_3}$ Major product :

(a)  (b)  (c)  (d) None of these

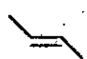
74. Which of the following has zero dipole moment?

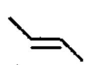
(a)  (b) 

(c)  (d) 

75. Which of the following is correct order of stability of alkene?

(a) CH_3—CH=CH_2 <  <  < 

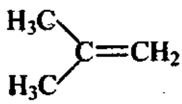
(b) CH_3—CH=CH_2 <  <  < 

(c)  <  <  < CH_3—CH=CH_2

(d)  < CH_3—CH=CH_2 <  < 

76. Which of the following alkenes is most reactive towards electrophilic addition reaction?

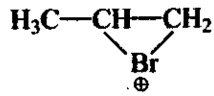
(a) $H_2C{=}CH_2$ (b) $CH_3{-}CH{=}CH_2$

(c) 

(d) $H_2C{=}CH{-}Cl$

77. Propene reacts with Br_2 to give 1, 2-dibromopropane. The anti-addition takes place due to the formation of intermediate :

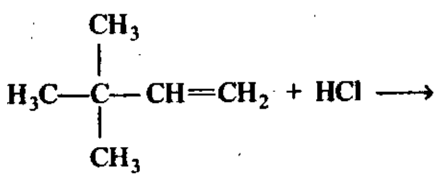
(a) $CH_3{-}\overset{Br}{\overset{|}{CH}}{-}\overset{\oplus}{C}H_2$

(b) 

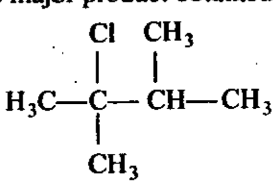
(c) $H_3C{-}\overset{\oplus}{C}H{-}CH_2{-}Br$

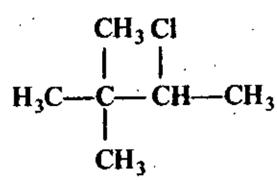
(d) None of these

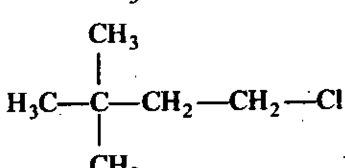
78. Consider the following reaction :



The major product obtained in the reaction is :

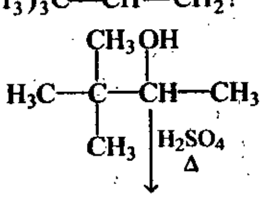
(a) 

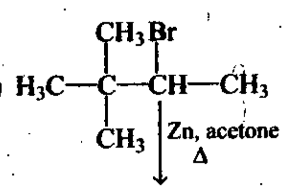
(b) 

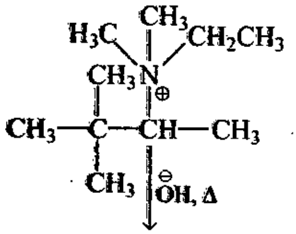
(c) 

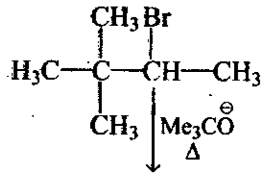
(d) None of these

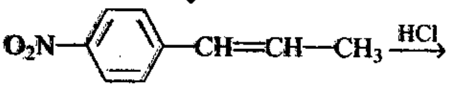
79. Which of the following reactions is expected to give a fairly good yield of $(CH_3)_3C{-}CH{=}CH_2$?

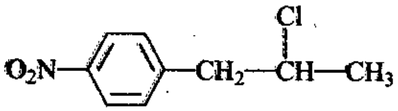
(a) 

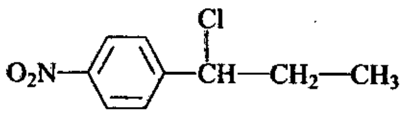
(b) 

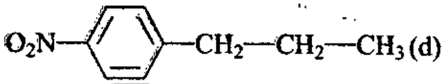
(c) 

(d) 

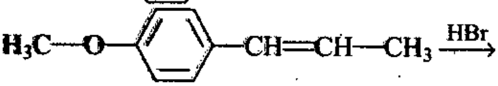
80.  Major product :

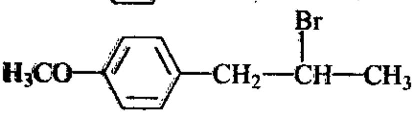
(a) 

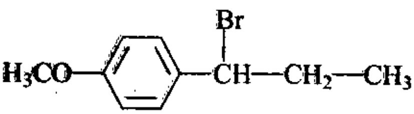
(b) 

(c) 

(d) None of these

81.  Major product :

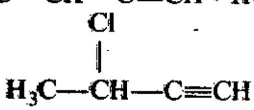
(a) 

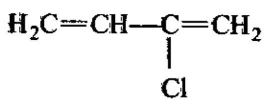
(b) 

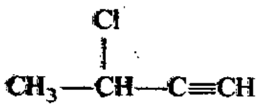
(c) Both (a) and (b) in same amount

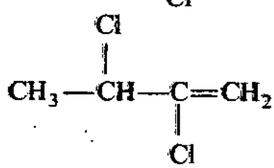
(d) None of the above

82. $H_2C{=}CH{-}C{\equiv}CH + HCl \longrightarrow X$; '$X$' is :

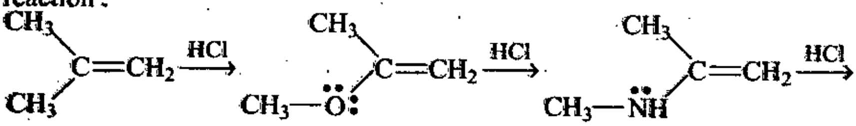
(a) 

(b) 

(c) 

(d) 

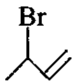
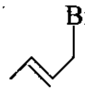
83. Arrange the following reactions in decreasing order of electrophilic addition reaction :



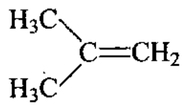
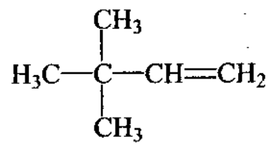
(P) (Q) (R)

(a) $P > Q > R$ (b) $Q > R > P$ (c) $R > Q > P$ (d) $P = Q = R$

84.  $\xrightarrow{\text{HBr (1 Mole)}}$ Major product :

(a)  (b)  (c)  (d) None of these

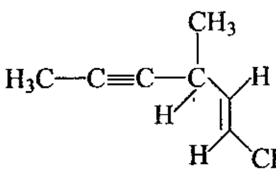
85. The reactivity of alkene

$H_3C-CH=CH_2$  

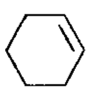
(*X*) (*Y*) (*Z*)

towards hydrogen is :

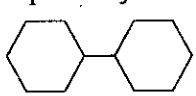
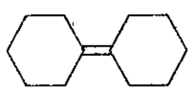
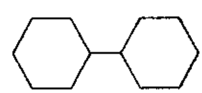
(a) $X > Y > Z$ (b) $Y > X > Z$ (c) $Z > X > Y$ (d) $Y > Z > X$

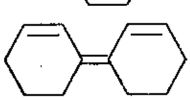
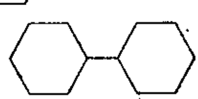
86.  $\xrightarrow[\text{Isoquinoline}]{H_2,\ Pd—BaSO_4}$ Product :

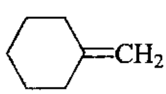
(a) an optically active compound
(b) an optically inactive compound
(c) a racemic mixture
(d) a diastereomeric mixture

87. 2  $\xrightarrow{\text{Conc. } H_2SO_4} A \xrightarrow{Pt/H_2} B$

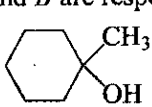
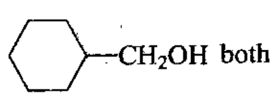
A and *B* respectively are :

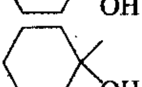
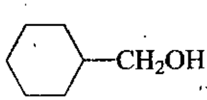
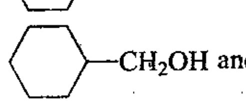
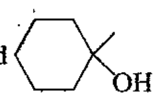
(a) Both  (b) , 

(c) ,  (d) , 

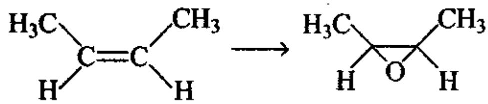
88. $B \xleftarrow[H_2O_2/\overset{\ominus}{O}H]{BH_3\,.\,THF}$  $\xrightarrow[NaBH_4,\ \overset{\ominus}{O}H]{Hg(OAc)_2,\ H_2O} A$

A and *B* are respectively :

(a)  both (b)  both

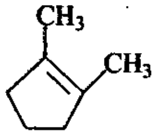
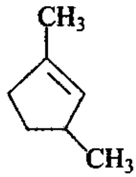
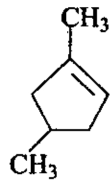
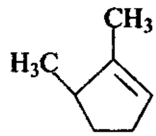
(c)  and  (d)  and 

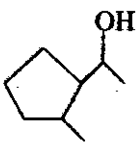
89. What reagent is needed to accomplish the following synthesis?

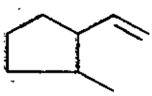
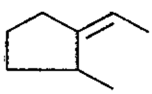
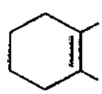
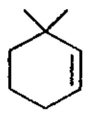


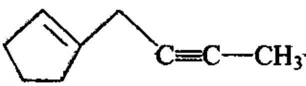
(a) $H_3\overset{\oplus}{O}$ (b) $KMnO_4, \overset{\ominus}{O}H$ (c) $O_3, Zn/H_2O$ (d) $Ph—CO_3H$

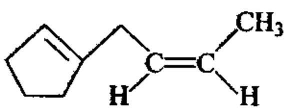
90. Which compound will yield 5-keto-2-methyl hexanal upon treatment with O_3?

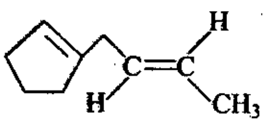
(a)  (b)  (c)  (d) 

91.  $\xrightarrow[\Delta]{\text{Conc. } H_3PO_4}$ Major product :

(a)  (b)  (c)  (d) 

92.  $\xrightarrow{H_2, \text{ Pd—BaSO}_4}$ Major product :

(a)  (b) 

(c)  (d) None of these

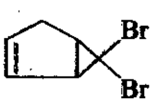
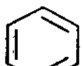
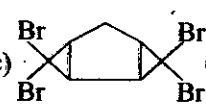
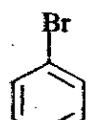
93. $H_3C—CH{=}CH_2 + HCl \xrightarrow{\text{Peroxide}}$ Product,

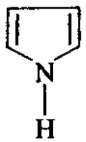
the intermediate of reaction is :

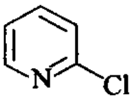
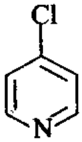
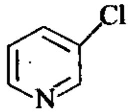
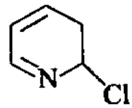
(a) $CH_3—\dot{C}H—CH_3$ (b) $CH_3—CH_2—\dot{C}H_2$

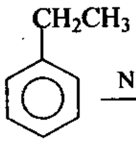
(c) $CH_3—\overset{\oplus}{C}H—CH_3$ (d) $CH_3—CH_2—\overset{\oplus}{C}H_2$

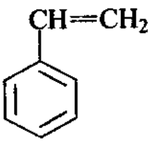
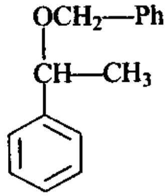
94.  $\xrightarrow{CHBr_3 + \text{Alc. KOH}}$ Major product :

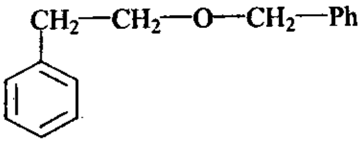
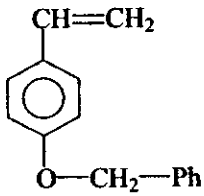
(a)  (b)  (c)  (d) 

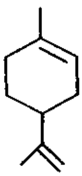
95.  $\xrightarrow{CHCl_3 + Alc.\ KOH}$ Major product :

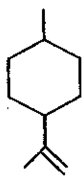
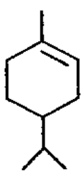
(a)  (b)  (c)  (d) 

96.  $\xrightarrow{NBS} X \xrightarrow{Alc.\ KOH} Y \xrightarrow[NaBH_4,\ \overset{\ominus}{O}H]{Hg(OAc)_2,\ Ph-CH_2OH} Z$; 'Z' is :

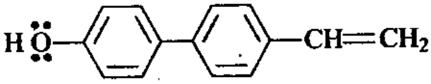
(a)  (b) 

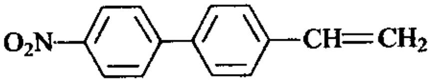
(c)  (d) 

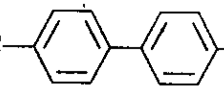
97.  $\xrightarrow[(1\ Mole)]{H_2,\ Ni}$ Product :

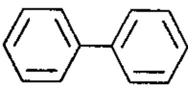
(a)  (b)  (c)  (d) No reaction

98. Fastest rate of electrophilic addition takes place in :

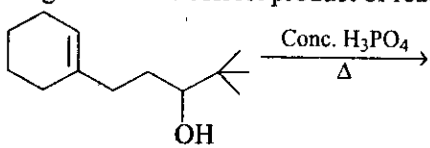
(a) 

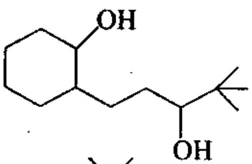
(b) 

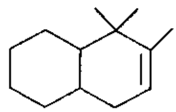
(c) H_3C—  —$CH{=}CH_2$

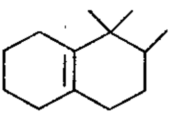
(d)  —$CH{=}CH_2$

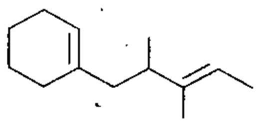
99. Which of the following will be the correct product of reaction?



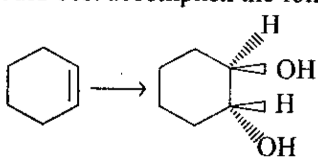
(a) 

(b) 

(c) 

(d) 

100. Give the reagent that would best accomplish the following reaction :



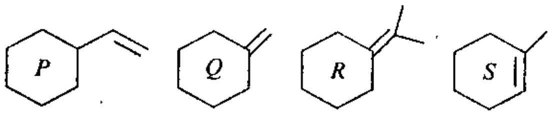
(a) Cold $KMnO_4$

(b) CF_3CO_3H, $H^{\oplus}/H_2O$

(c) O_3, $Zn—H_2O$

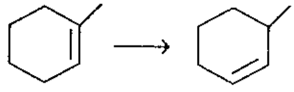
(d) $KMnO_4$, Δ, $\overset{\ominus}{O}H$

101. Arrange the following alkenes in increasing order of their enthalpy of hydrogenation ($—\Delta H$) :



(a) $R < S < Q < P$ (b) $R < S < P < Q$ (c) $P < Q < R < S$ (d) $P < Q < S < R$

102. Which reagent is best to perform the following transformation?



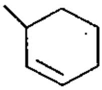
(a) HBr, NaOH

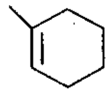
(b) HBr, $R—O—O—R$, hν; $Me_3C\overset{\ominus}{O}K^{\oplus}$

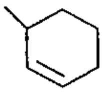
(c) BH_3.THF, $NaOH—H_2O_2$

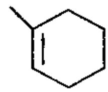
(d) Br_2, NaOH

103. Choose the reaction sequence that would best accomplish the preparation of 2-methylcyclohexanol :

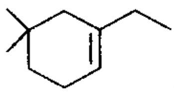
(a)  $\xrightarrow{H_2O,\ H_2SO_4}$

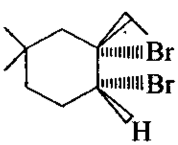
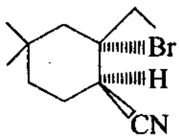
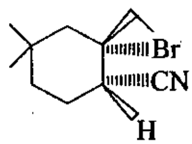
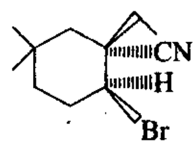
(b)  $\xrightarrow[NaBH_4,\ {}^{\ominus}OH]{Hg(OAc)_2,\ H_2O}$

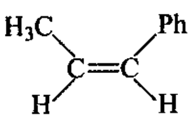
(c)  $\xrightarrow[H_2O_2,\ NaOH]{BH_3\ .\ THF}$

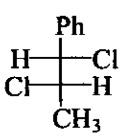
(d)  $\xrightarrow[H_2O,\ NaOH]{BH_3\ .\ THF}$

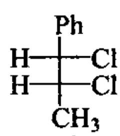
104. Give the major product of the following reaction

 $\xrightarrow{BrCN}$ Major product :

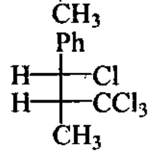
(a)  (b)  (c)  (d) 

105.  $\xrightarrow{Cl_2,\ CCl_4}$

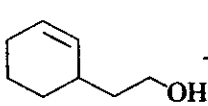
(a) 

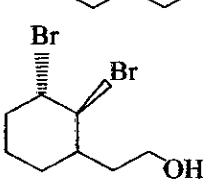
(b) 

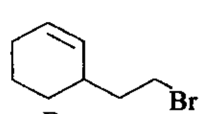
(c) Ph—C≡C—CH_3

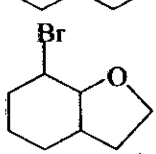
(d) 

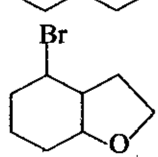
106. Give the major product of following reaction

 $\xrightarrow{Br_2/CCl_4}$ Major product :

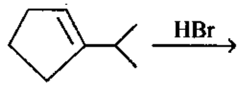
(a) 

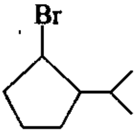
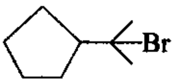
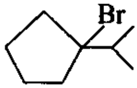
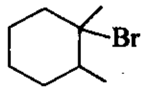
(b) 

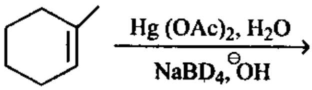
(c) 

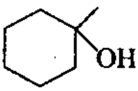
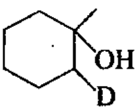
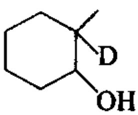
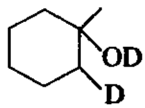
(d) 

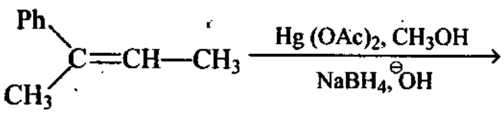
107. Which of the following products is not formed in following reaction?

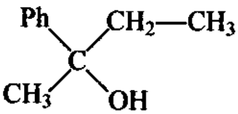


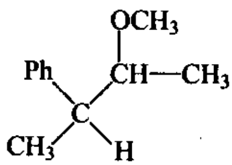
(a)  (b)  (c)  (d) 

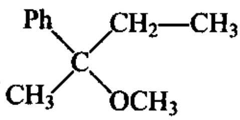
108.  Major product :

(a)  (b)  (c)  (d) 

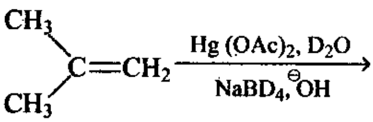
109.  Major product :

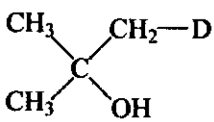
(a) 

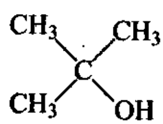
(b) 

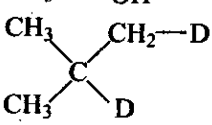
(c) 

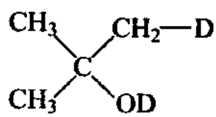
(d) None of these

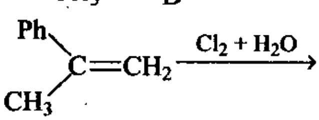
110.  Major product :

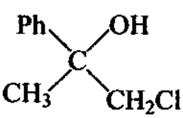
(a) 

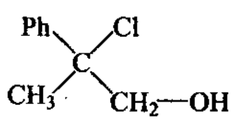
(b) 

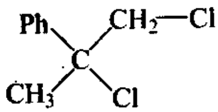
(c) 

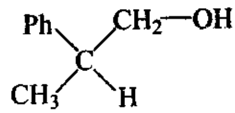
(d) 

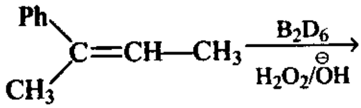
111.  Major product :

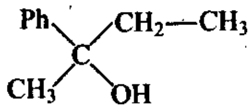
(a) 

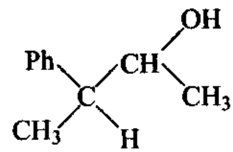
(b) 

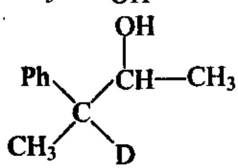
(c) 

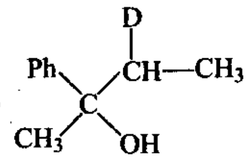
(d) 

112.  Major product :

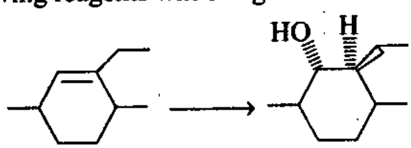
(a) 

(b) 

(c) 

(d) 

113. Which of the following reagents will bring about following transformations?



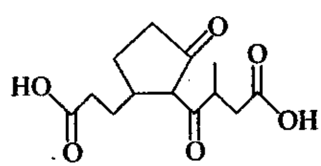
(a) Cl_2/H_2O

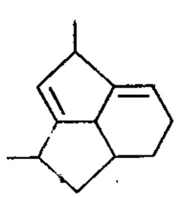
(b) $PBr_3/H^{\oplus}$

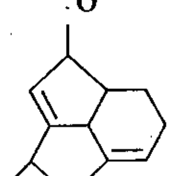
(c) $Hg(OAc)_2$, $H_2O/NaBH_4$, $\overset{\ominus}{O}H$

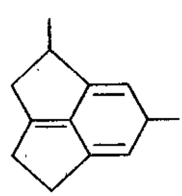
(d) BH_3.THF, $H_2O_2/\overset{\ominus}{O}H$

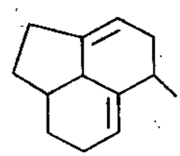
114. Which molecule will give following dicarboxylic acid upon treatment with acidic solution of $KMnO_4$?



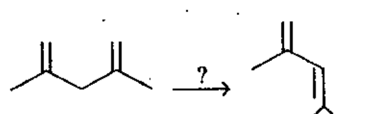
(a) 

(b) 

(c) 

(d) 

115. Which of the following reagents would best accomplish the following transformations?



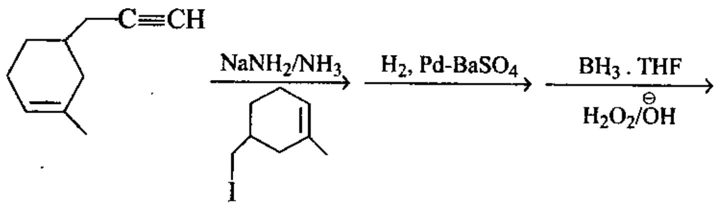
(a) Excess B_2H_6; $NaOH/H_2O_2$ followed by OsO_4

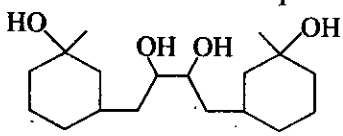
(b) Excess $Hg(OAc)_2/H_2O$; $NaBH_4$, $\overset{\ominus}{O}H$ followed by conc. H_2SO_4, Δ

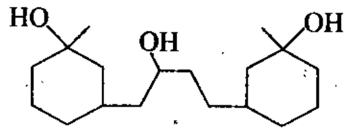
(c) O_3, Zn/H_2O followed by $Hg(OAc)_2/H_2O$; $NaBH_4$, $\overset{\ominus}{O}H$

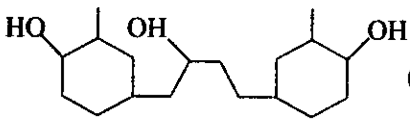
(d) OsO_4; $NaHSO_3$ followed by NaOH

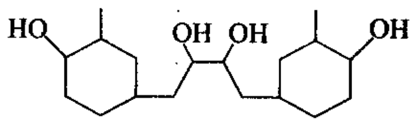
116. What is the product of the following sequence of reaction?



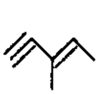
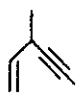
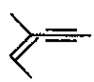
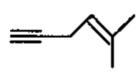
(a) 

(b) 

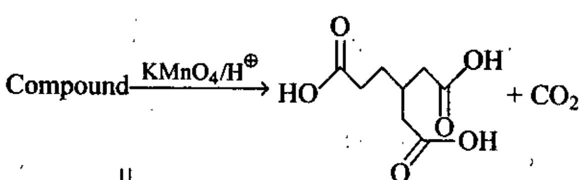
(c) 

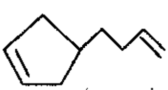
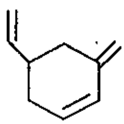
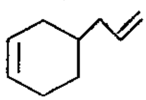
(d) 

117. Which would produce chiral molecule after treatment with Lindlar catalyst?

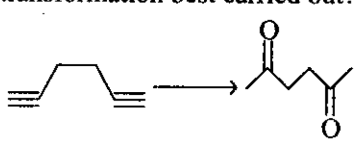
(a)  (b)  (c)  (d) 

118. Which of the following compounds was starting material for the oxidation shown below?



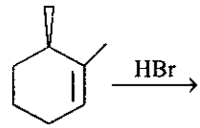
(a)  (b)  (c)  (d) 

119. How is the following transformation best carried out?



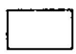
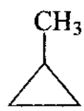
(a) OsO_4; $NaHSO_3$
(b) H_2SO_4/H_2O
(c) $HgSO_4/H_2SO_4$
(d) HIO_4

120. The product of following reaction can be best described as :

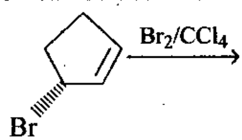


(a) a racemic mixture
(b) a single enantiomer
(c) a pair of diastereomers
(d) an achiral molecule

121.  $\xrightarrow{\text{NBS}} X \xrightarrow[\text{H}_2\text{O}_2,\ \Delta]{\text{HBr}} Y \xrightarrow[\Delta]{\text{Mg}} Z$; Z is :

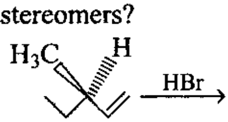
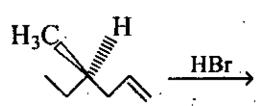
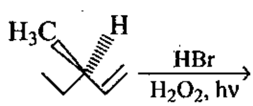
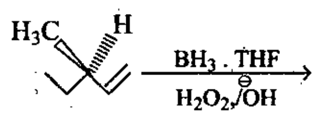
(a) 
(b) 
(c) 
(d) 

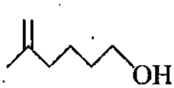
122. Product of following reaction can be best described as :

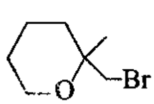
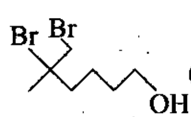
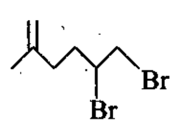
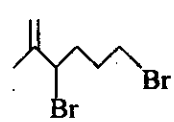


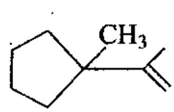
(a) meso product
(b) a pair of enantiomers
(c) structural isomer
(d) a pair of diastereomers

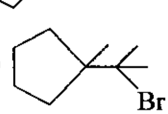
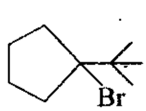
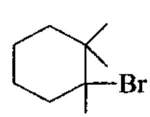
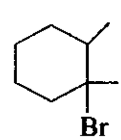
123. Which of the following reactions results in the formation of a pair of diastereomers?

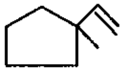
(a) 
(b) 
(c) 
(d) 

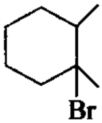
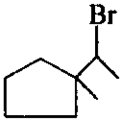
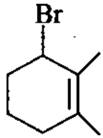
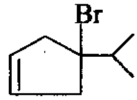
124.  $\xrightarrow{\text{Br}_2/\text{CS}_2}$ Major product :

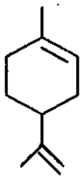
(a) 
(b) 
(c) 
(d) 

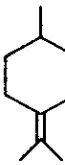
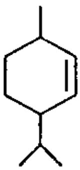
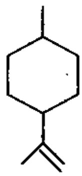
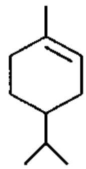
125.  $\xrightarrow{\text{HBr}}$ Major product :

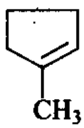
(a) 
(b) 
(c) 
(d) 

126.  $\xrightarrow{HBr/CCl_4}$ Major product :

(a)  (b)  (c)  (d) 

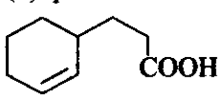
127.  $\xrightarrow[PtO_2]{H_2, (1 \text{ Mole})}$ Product :

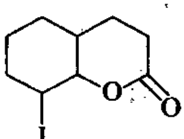
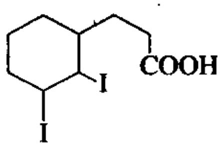
(a)  (b)  (c)  (d) 

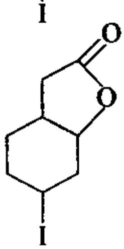
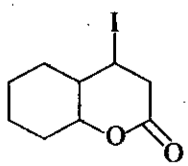
128.  $\xrightarrow[CCl_4]{Cl_2}$

Stereochemistry of the product are :

(a) diastereomers
(b) meso
(c) racemic mixture
(d) pure enantiomers

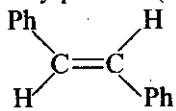
129.  $\xrightarrow{I_2/NaHCO_3}$ Major product :

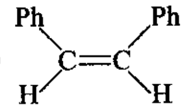
(a)  (b) 

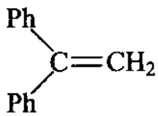
(c)  (d) 

130. Ph—CH=CH—Ph $\xrightarrow[CCl_4]{Cl_2}$ X $\xrightarrow{2NaNH_2}$ Y $\xrightarrow{H_2,\ Pd\text{-}CaCO_3}$ Z

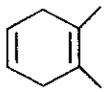
Identify product (Z) of the reaction.

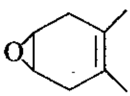
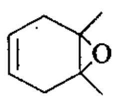
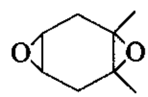
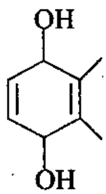
(a) 

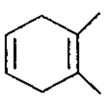
(b) 

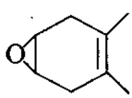
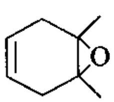
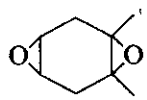
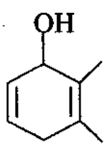
(c) 

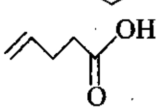
(d) Ph—C≡C—Ph

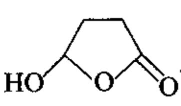
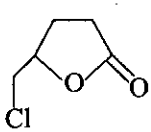
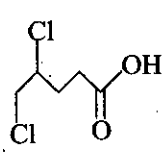
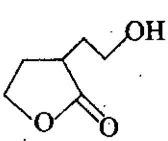
131.  $\xrightarrow{\text{Excess } CF_3CO_3H}$

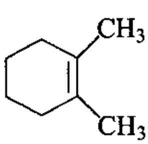
(a) 
(b) 
(c) 
(d) 

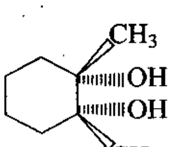
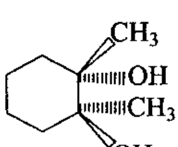
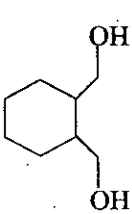
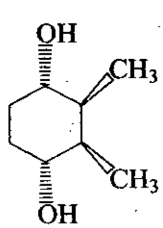
132.  $\xrightarrow{m\text{-CPBA (1 Mole)}}$

(a) 
(b) 
(c) 
(d) 

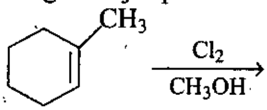
133.  $\xrightarrow[NaHCO_3]{Cl_2}$

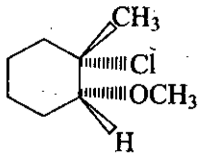
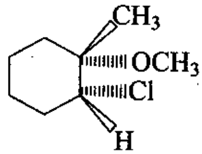
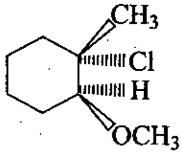
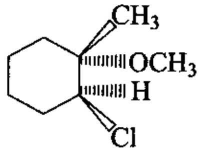
(a) 
(b) 
(c) 
(d) 

134.  $\xrightarrow[NaHSO_4]{OsO_4}$

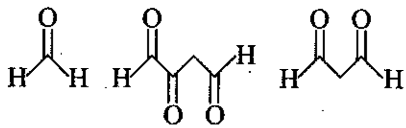
(a) 
(b) 
(c) 
(d) 

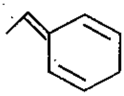
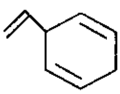
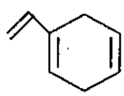
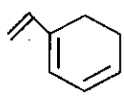
135. Which of the following is major product of reaction shown below?



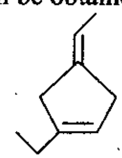
(a) 
(b) 
(c) 
(d) 

136. A triene treated with ozone followed by CH_3—S—CH_3 to give following three products. What is the structure of triene?

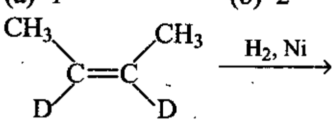
Product = 

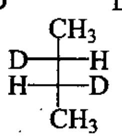
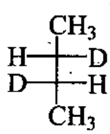
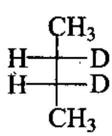
(a) 
(b) 
(c) 
(d) 

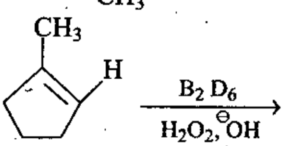
137. If the following compound is treated with Pd/C in excess of H_2 gas, how many stereoisomers of the product will be obtained?

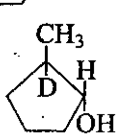
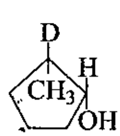
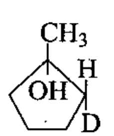
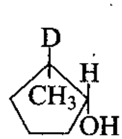


(a) 1 (b) 2 (c) 3 (d) 4

138.  Product :

(a) 
(b) 
(c) 
(d) All of these

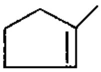
139. 

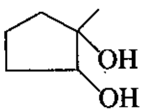
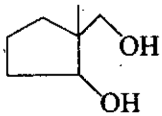
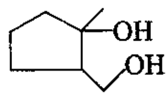
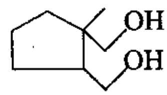
(a) 
(b) 
(c) 
(d) 

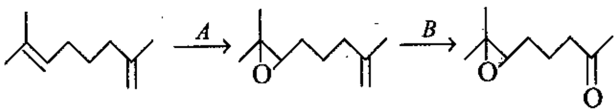
140. An organic compound C_4H_6 on reductive ozonolysis gives HCHO, CO_2 and CH_3CHO. Find structure of compound.

(a) $H_2C{=}CH{-}CH{=}CH_2$ (b) $CH_3{-}CH{=}C{=}CH_2$

(c)  (d) $H_3C{-}C{\equiv}C{-}CH_3$

141.  $\xrightarrow[H_2O]{HCHO,\ H^{\oplus}}$ Major product :

(a)  (b)  (c)  (d) 

142. 

Reagents (A) and (B) in above reaction :

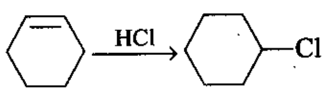
(a) CF_3CO_3H, H_2O_2

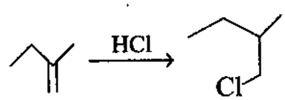
(b) CF_3CO_3H, HIO_4

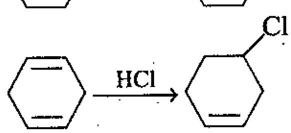
(c) CF_3CO_3H; O_3, Me_2S

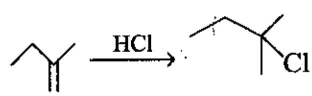
(d) All of the above

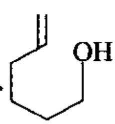
143. Which reaction will occur at the fastest rate?

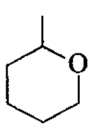
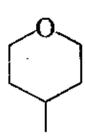
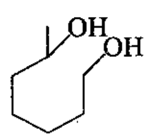
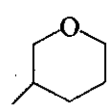
(a) 

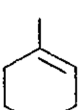
(b) 

(c) 

(d) 

144.  $\xrightarrow[2.\ NaBH_4,\ \overset{\ominus}{O}H]{1.\ Hg(OAc)_2}$ Major product :

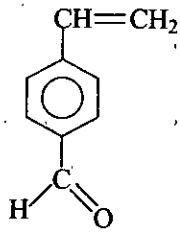
(a)  (b)  (c)  (d) 

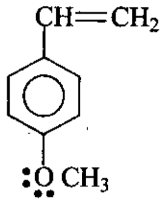
145.  $\xrightarrow[CS_2]{HBr}$

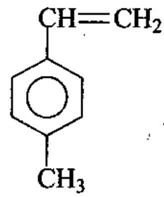
Comment on optical nature of product.

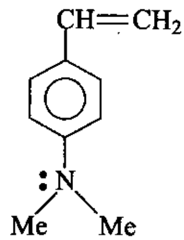
(a) Racemic mixture
(b) Enantiomer
(c) Diastereomer
(d) Optically inactive

146. Arrange the following compounds in decreasing order of rate of electrophilic addition reaction.

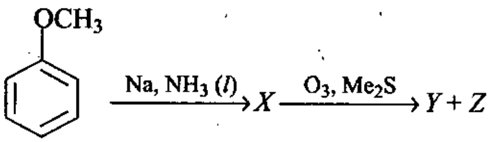

(*P*)


(*Q*)

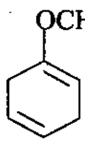
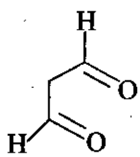

(*R*)

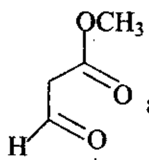
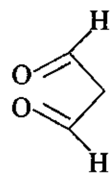

(*S*)

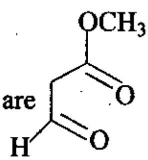
(a) $Q > S > P > R$
(b) $S > Q > R > P$
(c) $P > Q > R > S$
(d) $R > Q > S > P$

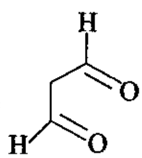
147. 

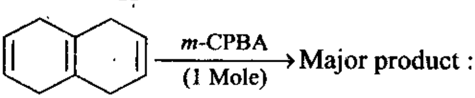
Identify products *Y* and *Z*.

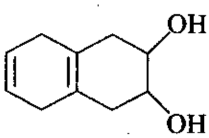
(a)  and 

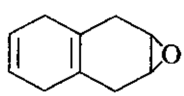
(b)  and 

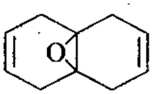
(c) Both are 

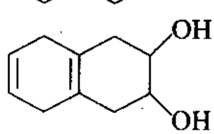
(d) Both are 

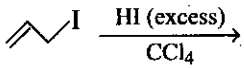
148. 

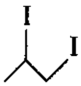
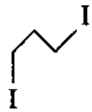
(a) 

(b) 

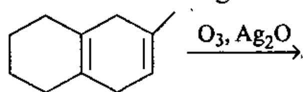
(c) 

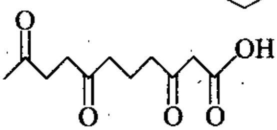
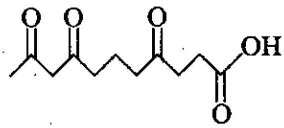
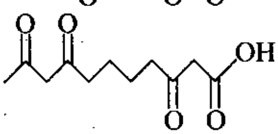
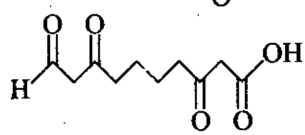
(d) 

149. 

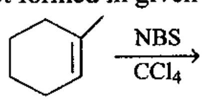
(a) 
(b) 
(c) 
(d) 

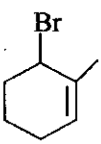
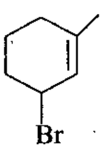
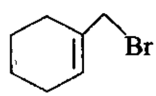
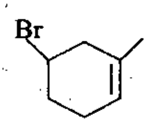
150. What is the final product of the following reaction?



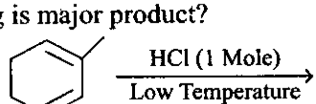
(a) 
(b) 
(c) 
(d) 

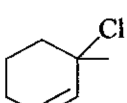
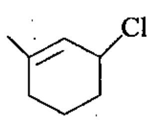
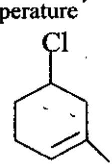
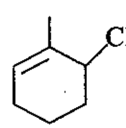
151. Which of the following is not formed in given reaction?



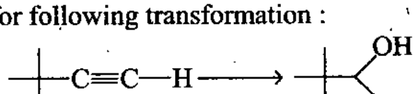
(a) 
(b) 
(c) 
(d) 

152. Which of the following is major product?



(a) 
(b) 
(c) 
(d) 

153. Select the reagent for following transformation :



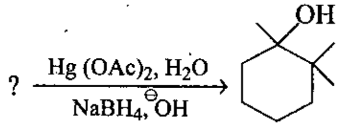
(a) H_2-Pd, HCHO, H_2SO_4

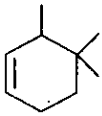
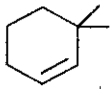
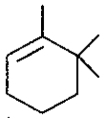
(b) H_2, Pd-$BaSO_4$; $Hg(OAc)_2$, H_2O, $NaBH_4$, $\overset{\ominus}{O}H$

(c) BH_3, H_2O_2, $\overset{\ominus}{O}H$, Pd-C

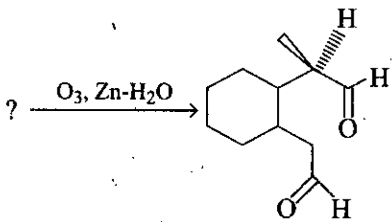
(d) Hg^{+2}, H_2SO_4, H_2, Pd-$BaSO_4$

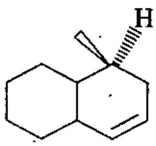
154. Select the starting material for following reaction :

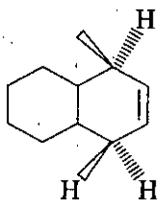


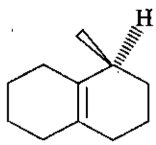
(a)  (b)  (c)  (d) Both (a) and (b)

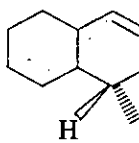
155. Select the best starting material for the following reaction :



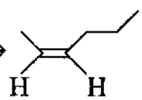
(a) 

(b) 

(c) 

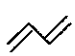
(d) 

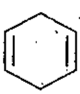
156. Choose the best reagent to carry out the following transformations :

$H_3C—C{\equiv}C—H \longrightarrow$ 

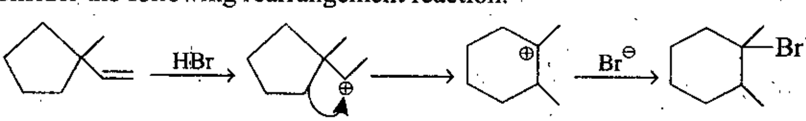
(a) Lindlar catalyst; $NaNH_2/NH_3$ (*l*), 1-bromopropane
(b) $NaNH_2/NH_3$ (*l*), 1-bromopropane; Lindlar catalyst
(c) $NaNH_2/NH_3$ (*l*), 1-bromopropane; Li/NH_3 (*l*)
(d) All of the above

157. Which of the following will be most reactive in the addition reaction with HBr?

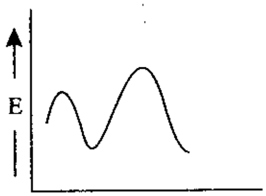
(a) $CH_3—C{\equiv}C—CH_3$ (b) 

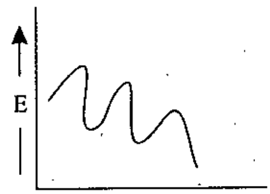
(c)  (d) 

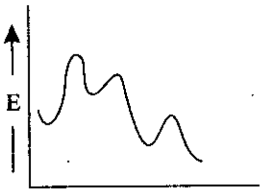
158. Consider the following rearrangement reaction.

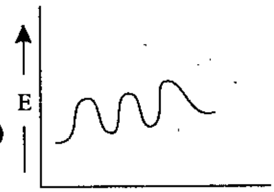


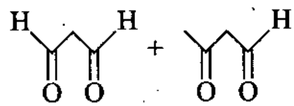
Which of the following reaction co-ordinates best represents overall reaction?

(a) 

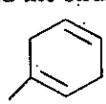
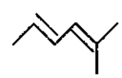
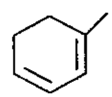
(b) 

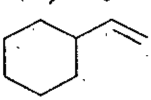
(c) 

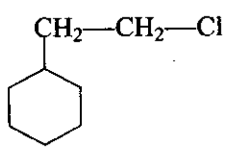
(d) 

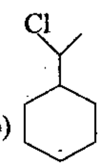
159. Compound (X) $\xrightarrow{O_3,\ Zn\text{-}H_2O}$ 

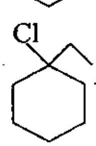
Find the structure of (X).

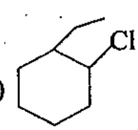
(a)  (b)  (c)  (d) 

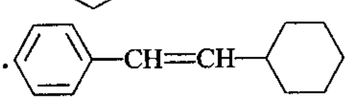
160.  $\xrightarrow{HCl}$ Major product :

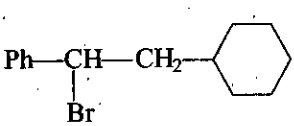
(a) 

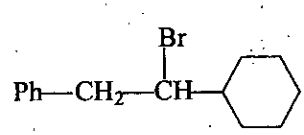
(b) 

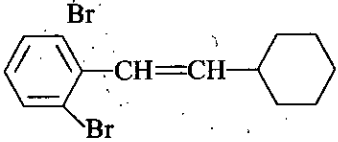
(c) 

(d) 

161.  $\xrightarrow{HBr}$ Major product :

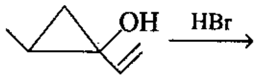
(a) 

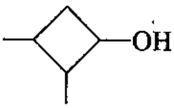
(b) 

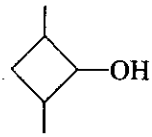
(c) 

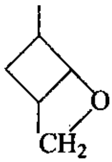
(d) Both (a) and (b)

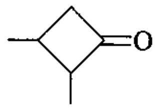
162. The product of following reaction can be :

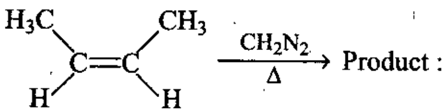


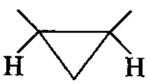
(a) 

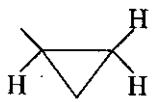
(b) 

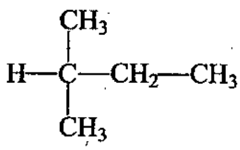
(c) 

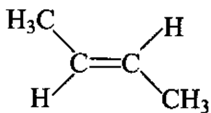
(d) 

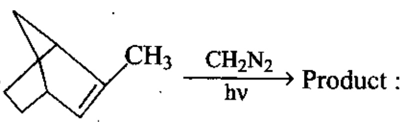
163. 

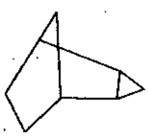
(a) 

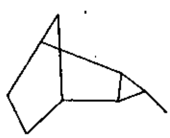
(b) 

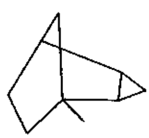
(c) 

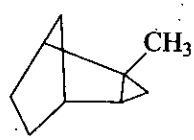
(d) 

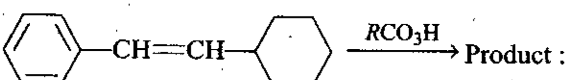
164. 

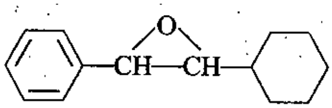
(a) 

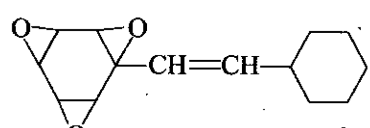
(b) 

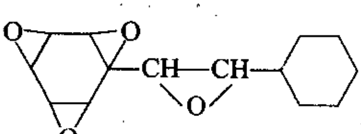
(c) 

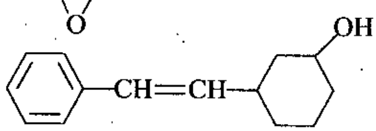
(d) 

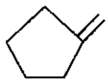
165. 

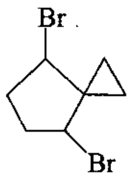
(a) 

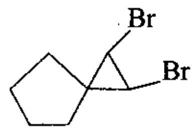
(b) 

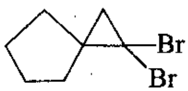
(c) 

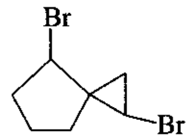
(d) 

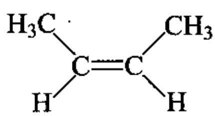
166.  $\xrightarrow[Me_3CO^{\ominus}K^{\oplus}]{CHBr_3}$ Product :

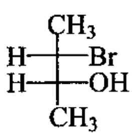
(a) 

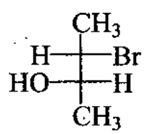
(b) 

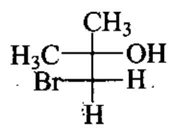
(c) 

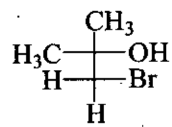
(d) 

167.  $\xrightarrow{Br_2 + H_2O}$ Product :

(a) 

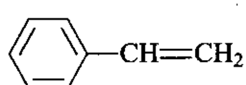
(b) 

(c) 

(d) 

168. Rates of hydration of the following alkenes are :

$\underset{(P)}{CH_3-O-CH=CH_2}$ $\underset{(Q)}{F-CH=CH_2}$ $\underset{(R)}{CH_3-CH=CH_2}$

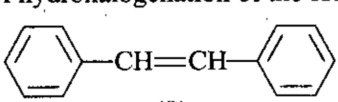


(*S*)

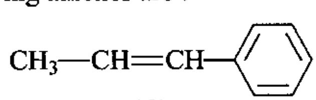
(a) $P > Q > R > S$ (b) $S > R > Q > P$

(c) $P > S > R > Q$ (d) $R > S > P > Q$

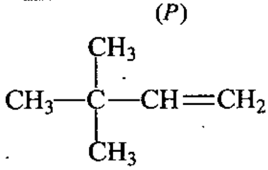
169. Rates of hydrohalogenation of the following alkenes are :



(*P*)



(*Q*)



(*R*)

$CH_3-CH=CH-CH_3$

(*S*)

(a) $P > Q > R > S$ (b) $Q > P > R > S$

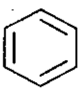
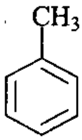
(c) $Q > P > S > R$ (d) $P > Q > S > R$

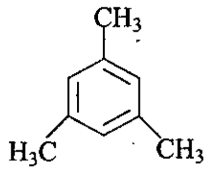
170. Rates of addition of Cl_2/H_2O of the following alkenes are :

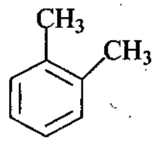
$\underset{(P)}{CH_2=CH_2}$ $\quad \underset{(Q)}{CH_2=CH-\overset{\overset{O}{\|}}{C}-H}$ $\quad \underset{(R)}{CH_3-CH_2-CH=CH_2}$ $\quad \underset{(S)}{CH_3-\overset{\overset{CH_3}{|}}{C}=CH_2}$

(a) $S > R > P > Q$ (b) $S > P > Q > R$
(c) $P > Q > R > S$ (d) $P > Q > S > R$

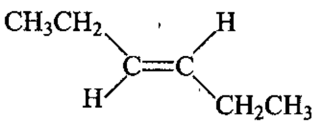
171. $3CH_3-C\equiv CH \xrightarrow[\text{Cu tube}]{\text{Red hot}}$

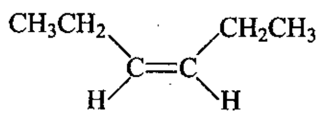
(a) 
(b) 

(c) 

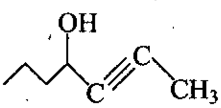
(d) 

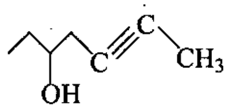
172. $CH_3CH_2C\equiv CH \xrightarrow{NaNH_2/NH_3(l)} \xrightarrow{CH_3CH_2Br} \xrightarrow{Li,\ NH_3(l)}$

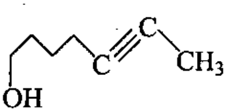
(a) $CH_3CH_2CH=CH-CH_3$ (b) $CH_3CH_2CH=CH_2$
(c) 

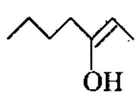
(d) 

173. $CH_3CH_2CH_2-\overset{\overset{O}{\|}}{C}-H + CH_3-C\equiv CH \xrightarrow{Na,\ NH_3(l)}$

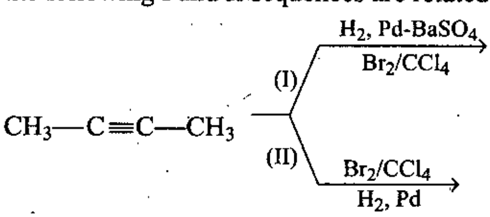
(a) 

(b) 

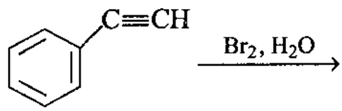
(c) 

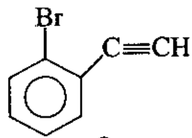
(d) 

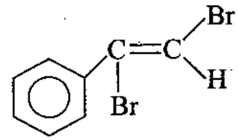
174. The products of the following I and II sequences are related as :

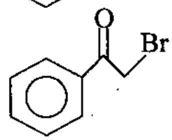


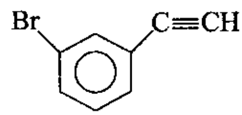
(a) diastereomers (b) identical
(c) enantiomers (d) geometrical isomers

175. 

(a) 

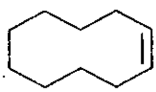
(b) 

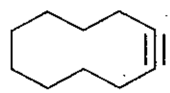
(c) 

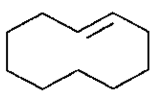
(d) 

176. $HC{\equiv}CH \xrightarrow[Cl-(CH_2)_8-Cl]{KNH_2} A \xrightarrow[Pd\text{-}CaCO_3]{H_2} B \xrightarrow{Br_2/CCl_4} C \xrightarrow[(2\ Mole)]{KNH_2} D$

$\xrightarrow{Na,\ NH_3(l)} E$; E is :

(a) 

(b) 

(c) 

(d) None of these

177. Which is the most suitable reagent among the following to distinguish compound (3) from rest of the compound?

1. $CH_3-C{\equiv}C-CH_3$

2. $CH_3-CH_2-CH_2-CH_3$

3. $CH_3CH_2-C{\equiv}CH$

4. $CH_3-CH{=}CH_2$

(a) Br_2 in CCl_4
(b) Br_2 in CH_3COOH
(c) Alk. $KMnO_4$
(d) $AgNO_3/NH_4OH$

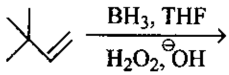
178. Two gases P and Q both decolourise aqueous bromine but only one of them gives white ppt with Tollen's reagent. P and Q are likely to be :

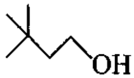
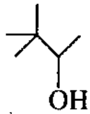
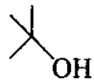
(a) $H_2C{=}CH_2$ and $CH_3-C{\equiv}C-CH_3$

(b) $HC{\equiv}CH$ and $CH_3-CH_2-C{\equiv}CH$

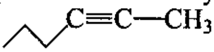
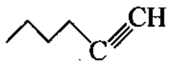
(c) $HC{\equiv}CH$ and $CH_3-C{\equiv}CH$

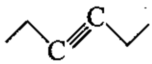
(d) $CH_3-CH_2-C{\equiv}CH$ and $CH_3-C{\equiv}C-CH_3$

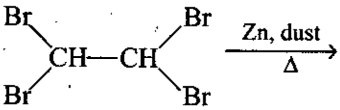
179. 

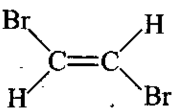
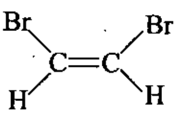
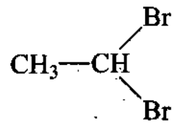
(a)  (b)  (c)  (d) 

180. Which of the following hydrocarbons should be choosen as a starting material to prepare 3-hexanone by the hydration?

(a)  (b) 

(c)  (d) 

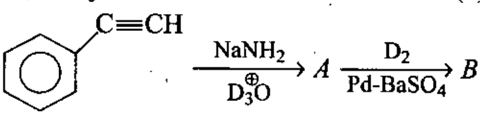
181. 

(a)  (b)  (c) $H-C\equiv C-H$ (d) 

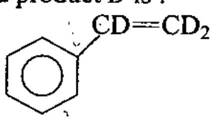
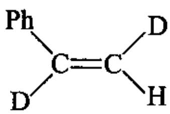
182. Among the following compounds which one cannot decolourise alkaline $KMnO_4$ solution?

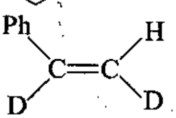
(a) $HC\equiv CH$ (b) CH_3-CH_2-OH

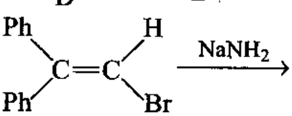
(c) $CH_3-\overset{\overset{O}{\|}}{C}-H$ (d) CH_3-CH_3

183. 

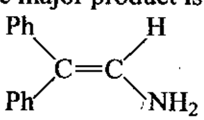
End product B is :

(a)  (b) 

(c)  (d) $Ph-C\equiv CD$

184. 

The major product is :

(a)  (b) $Ph-C\equiv C-Ph$

(c) $Ph-C\equiv CH$ (d) None of these

185. $Ph—C{\equiv}CH$ $\xrightarrow[H_2O_2,\ \overset{\ominus}{O}H]{(Sia)_2BH} P$

$Ph—C{\equiv}CH$ $\xrightarrow{Hg^{+2},\ H_2SO_4} Q$

P and *Q* are respectively :

(a) $Ph—\overset{O}{\overset{\|}{C}}—CH_3$ and $Ph—CH_2—\overset{O}{\overset{\|}{C}}—H$

(b) $Ph—CH_2—CHO$ and $Ph—\overset{O}{\overset{\|}{C}}—CH_3$

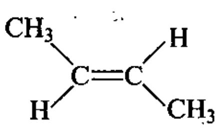
(c) $Ph—\overset{O}{\overset{\|}{C}}—CH_3$ and $Ph—\overset{O}{\overset{\|}{C}}—CH_3$

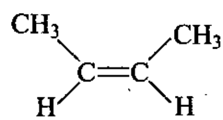
(d) $Ph—CH_2—CHO$ and $Ph—CH_2—CHO$

186. $CH_3—C{\equiv}C—CH_3 \xrightarrow[CH_3COOH]{BH_3.THF}$ Major product :

(a) $CH_3—CH_2—\overset{O}{\overset{\|}{C}}—CH_3$

(b) $CH_3CH_2CH_2—\overset{O}{\overset{\|}{C}}—H$

(c) 

(d) 

187. Which of the following molecules is not linear?

(a) $O{=}C{=}C{=}C{=}O$

(b) $H_2C{=}C{=}O$

(c) $HC{\equiv}C—C{\equiv}CH$

(d) $HC{\equiv}CH$

188. Which of the following reagents can be distinguish propyne from propene?

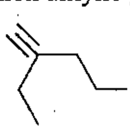
(a) Br_2, CCl_4

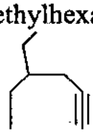
(b) Dilute $KMnO_4$

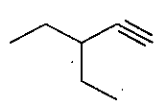
(c) Conc. H_2SO_4

(d) $AgNO_3$ in NH_4OH

189. Which alkyne gives 3-ethylhexane on catalytic hydrogenation?

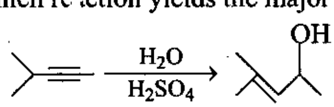
(a) 

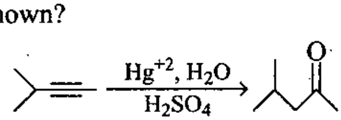
(b) 

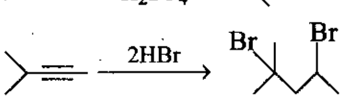
(c) 

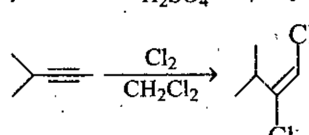
(d) All of these

190. Which reaction yields the major product shown?

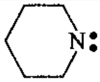
(a) 

(b) 

(c) 

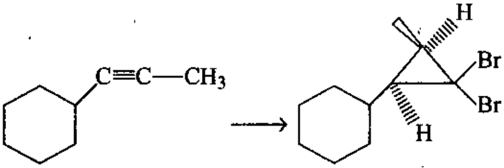
(d) 

191. $Ph—C{\equiv}C—H \xrightarrow{I_2}$ Major product :



(a) $Ph—C(I){=}CH—I$ (b) $Ph—CH(I)—CH_2—I$

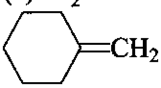
(c) $Ph—C{\equiv}C—I$ (d) $I—C{\equiv}C—H$

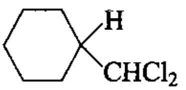
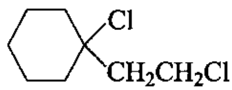
192. 

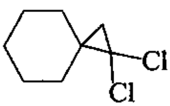
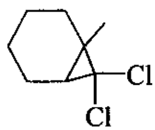
To carry out above conversion which reagent will be used?

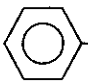
(a) $CHBr_3/NaOH$, $Na/NH_3\,(l)$ (b) $Na/NH_3\,(l)$, $CHBr_3/NaOH$

(c) $H_2/Pd\text{-}BaSO_4$, $CHBr_3/NaOH$ (d) $H_2/Pd\text{-}CaCO_3$, $CHCl_3/KOH$

193.  $+ CHCl_3 \xrightarrow{KOH}$ Major product :

(a)  (b) 

(c)  (d) 

194.  $—CH{=}CH—NO_2 \xrightarrow[EtOH]{H_2,\ Pd}$ Major product :

(a) $Ph—CH_2—CH_2—NO_2$ (b) $Ph—CH_2—CH_2—NH_2$

(c) $Ph—CH_2—CH_2—NH—OH$ (d)  $—CH_2—CH_2—NO_2$

195. $CH_3—CH_2—\ddot{\underset{\cdot\cdot}{O}}—CH{=}CH_2 \xrightarrow{H_2O/H_2SO_4}$

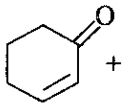
The product/s formed in the reaction is/are :

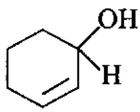
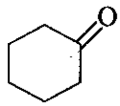
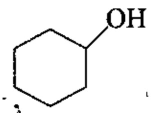
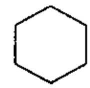
(a) $CH_3—CH_2—O—CH_2—CH_2—OH$

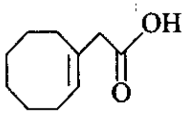
(b) $CH_3—CH_2—O—CH(OH)—CH_3$

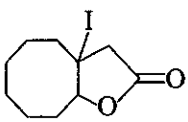
(c) $CH_3—CH_2—OH$ and $HO—CH{=}CH_2$

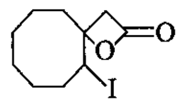
(d) $CH_3CH_2—OH$ and $CH_3—C(=O)—H$

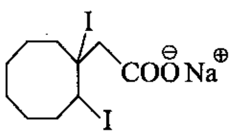
196.  $+ H_2 \xrightarrow[\text{Ethanol}]{\text{Pd/C}}$

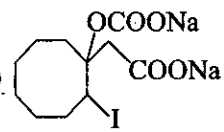
(a)  (b)  (c)  (d) 

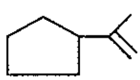
197.  $\xrightarrow{I_2,\ NaHCO_3}$ Major product :

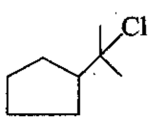
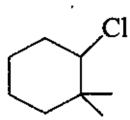
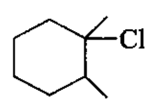
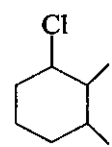
(a) 

(b) 

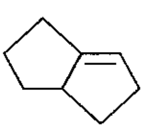
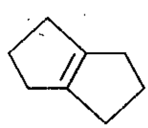
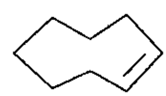
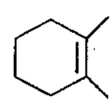
(c) 

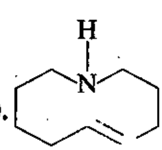
(d) 

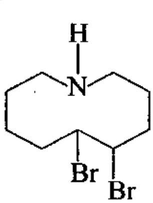
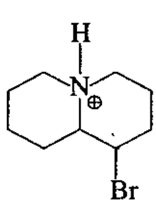
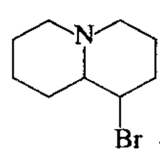
198.  $\xrightarrow[CCl_4]{HCl}$ Major product :

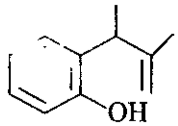
(a)  (b)  (c)  (d) 

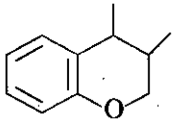
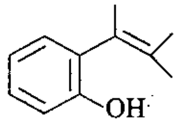
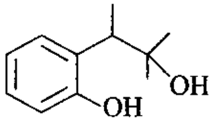
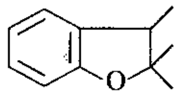
199. Which of the following compounds produces-1, 5-cyclooctanedione on ozonolysis?

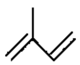
(a)  (b)  (c)  (d) 

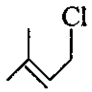
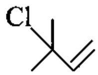
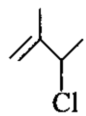
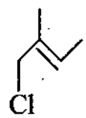
200.  $\xrightarrow{Br_2/CCl_4}$ Major product :

(a)  (b)  (c)  (d) All of these

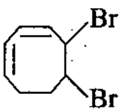
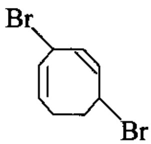
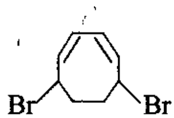
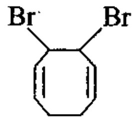
201.  $\xrightarrow{H^{\oplus}}$ Major product :

(a) 
(b) 
(c) 
(d) 

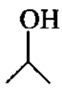
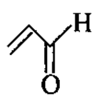
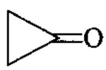
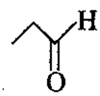
202.  $\xrightarrow{\text{HCl (1 Mole)}}$ Major product :

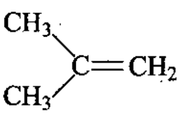
(a) 
(b) 
(c) 
(d) 

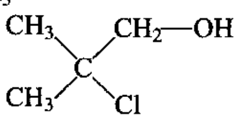
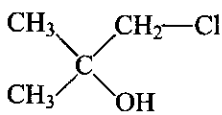
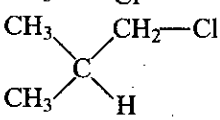
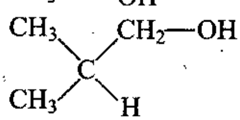
203.  + Br_2 (1 Mole) $\xrightarrow{CCl_4}$ Major product :

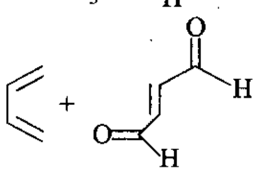
(a) 
(b) 
(c) 
(d) 

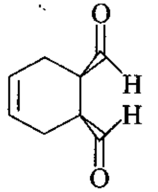
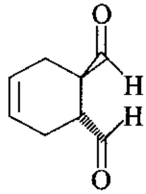
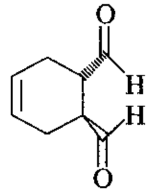
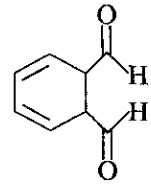
204. $H_2C{=}CH_2 + CO + H_2 \xrightarrow[\text{100°C, High P}]{Co_2(Co)_8}$

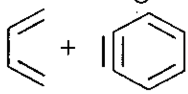
(a) 
(b) 
(c) 
(d) 

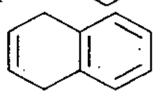
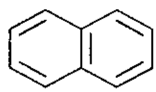
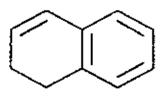
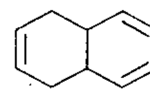
205.  $\xrightarrow{HOCl}$ Major product :

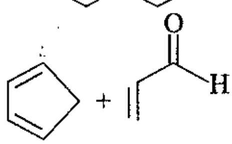
(a) 
(b) 
(c) 
(d) 

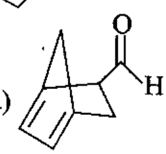
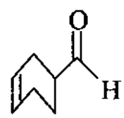
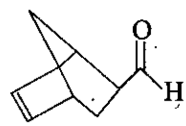
206.  $\xrightarrow{\Delta}$ Major product :

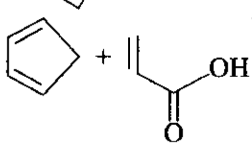
(a)  (b)  (c)  (d) 

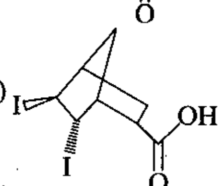
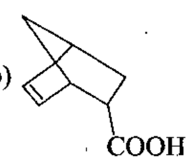
207.  $\xrightarrow{\Delta}$ Major product :

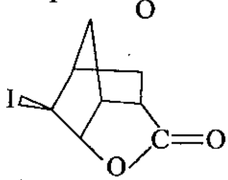
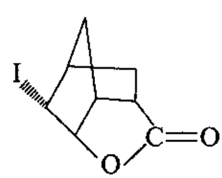
(a)  (b)  (c)  (d) 

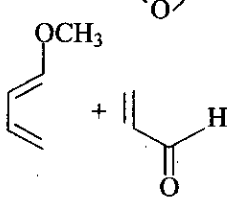
208.  $\xrightarrow{\Delta}$ Major product :

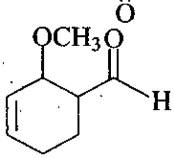
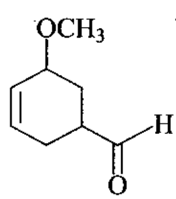
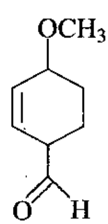
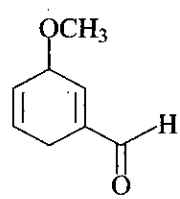
(a)  (b)  (c)  (d) No reaction

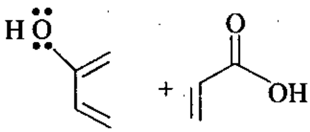
209.  $\xrightarrow{\Delta}$ $\xrightarrow{I_2/NaHCO_3}$ Y; Y is :

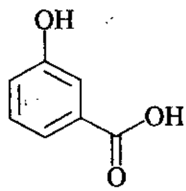
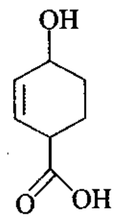
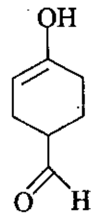
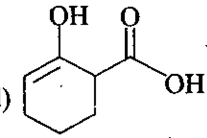
(a)  (b) 

(c)  (d) 

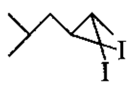
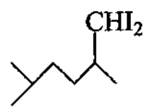
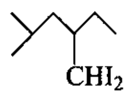
210.  $\xrightarrow{\Delta}$ Major product :

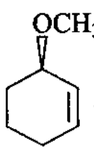
(a)  (b)  (c)  (d) 

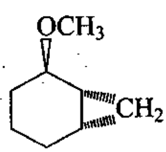
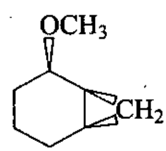
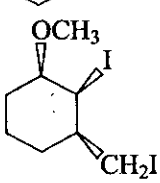
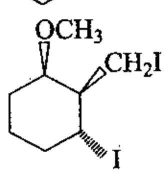
211.  $\xrightarrow{\Delta}$ Major product :

(a) 
(b) 
(c) 
(d) 

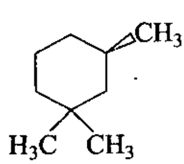
212.  + CH_2I_2 $\xrightarrow{Zn, \Delta}$ Major product :

(a) 
(b) 
(c) 
(d) 

213.  $\xrightarrow[\Delta]{CH_2I_2, Zn}$ Major product :

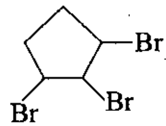
(a) 
(b) 
(c) 
(d) 

214. Find out nature of product obtained by selective bromination of following reactant :

 $\xrightarrow[hv]{Br_2}$

(a) Meso
(b) Diastereomers
(c) Enantiomers
(d) Homomers

215. Devise a synthesis of following compound from cyclopentane :



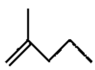
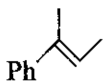
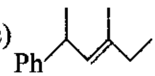
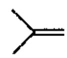
(a) $\xrightarrow[hv]{Cl_2} \xrightarrow{\text{alc. KOH}} \xrightarrow[CCl_4]{Br_2}$

(b) $\xrightarrow[hv]{Br_2} \xrightarrow{C_2H_5O^{\ominus}} \xrightarrow{Br_2, CCl_4}$

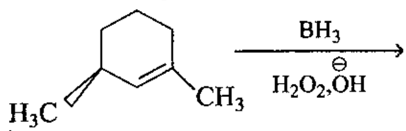
(c) $\xrightarrow[hv]{Br_2} \xrightarrow{\text{alc. KOH}} \xrightarrow{\text{NBS}} \xrightarrow[CCl_4]{Br_2}$

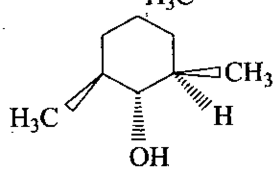
(d) None of these

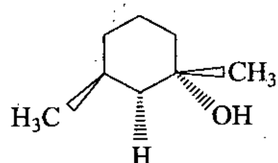
216. Which of the following alkene will give enantiomeric product on reaction with HBr?

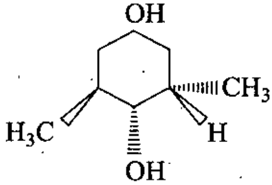
(a)  (b)  (c)  (d) 

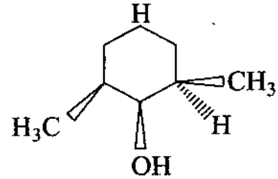
217. Draw the product of following reaction with stereochemistry :



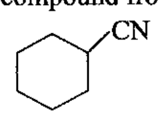
(a) 

(b) 

(c) 

(d) 

218. Devise synthesis of following compound from cyclohexene :

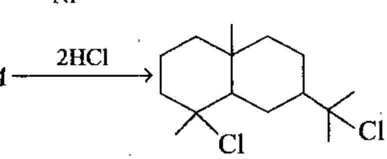


(a) Addition of HCN

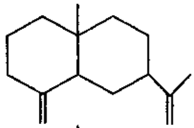
(b) $\xrightarrow{HBr}, \xrightarrow{NaCN}$

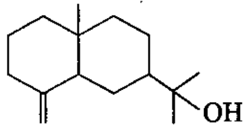
(c) $\xrightarrow[Ni]{H_2}, \xrightarrow{NaCN}$

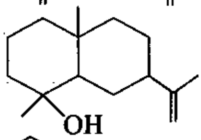
(d) $\xrightarrow{NBS}, \xrightarrow{HCN}, \xrightarrow{H^{\oplus}/H_2O}$

219. 

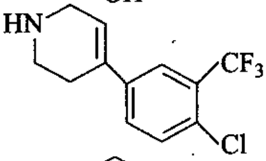
Reactant '*A*' is :

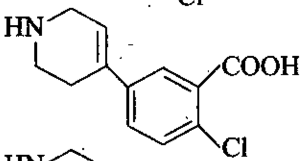
(a) 

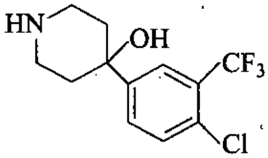
(b) 

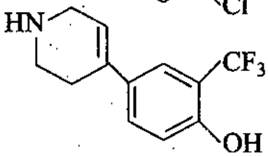
(c) 

(d) All of these

220.  $\xrightarrow[2.\ H_2O]{1.\ HBr}$

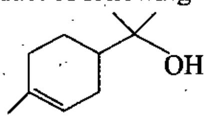
(a) 

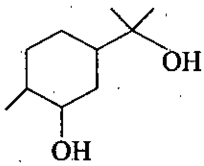
(b) 

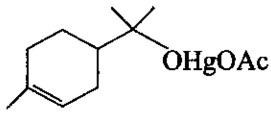
(c) 

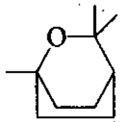
(d) None of these

221. Suggest the product of following reaction :

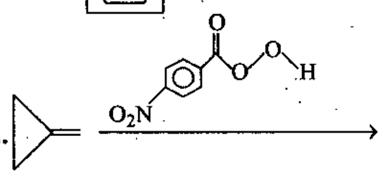
 $\xrightarrow[2.\ NaBH_4]{1.\ Hg(OAc)_2}$

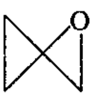
(a) 

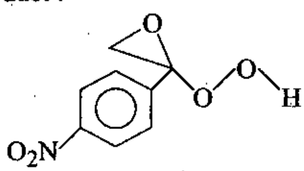
(b) 

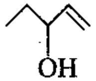
(c) 

(d) All of these

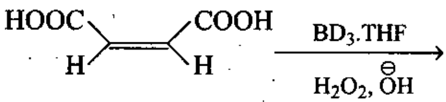
222.  Major product :

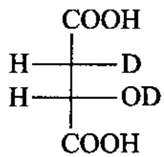
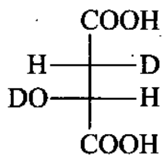
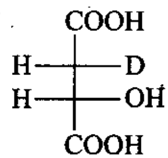
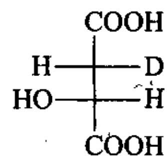
(a) 

(b) 

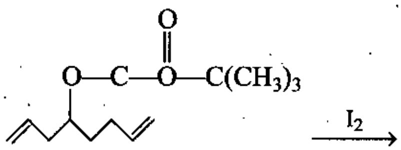
(c) 

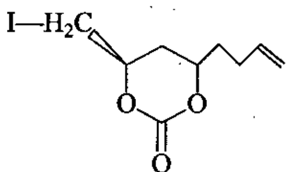
(d) None of these

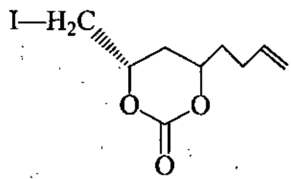
223. 

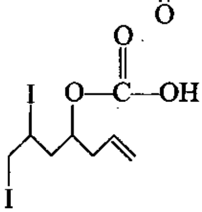
(a)  (b)  (c)  (d) 

224. Find out major product :

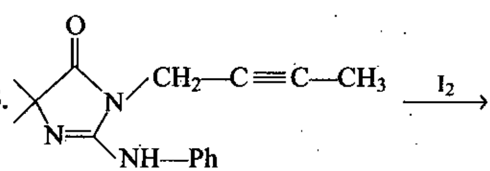


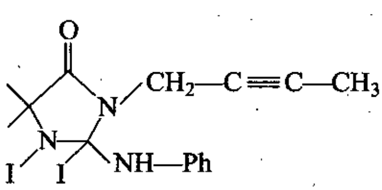
(a) 

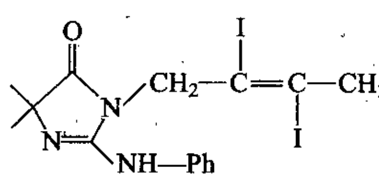
(b) 

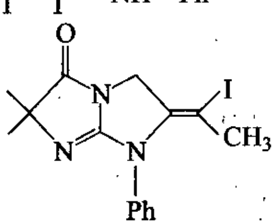
(c) 

(d) No reaction

225.  Product :

(a) 

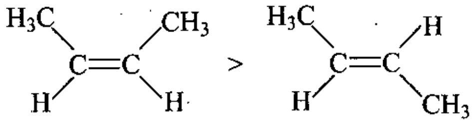
(b) 

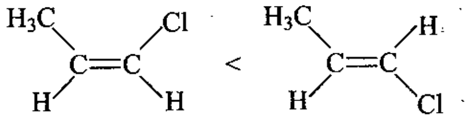
(c) 

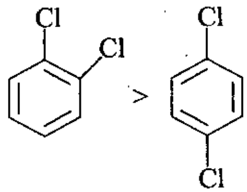
(d) None of these

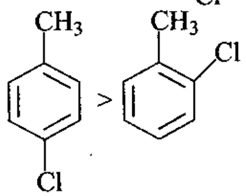
EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which are correct regarding boiling point?

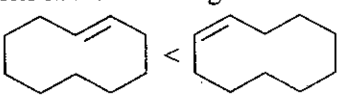
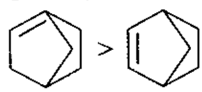
(a) 

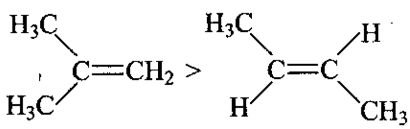
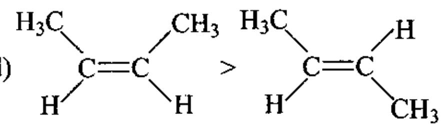
(b) 

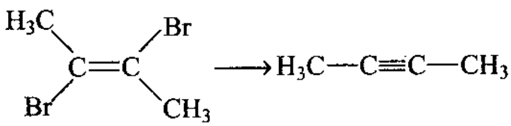
(c) 

(d) 

2. Which of the following orders are correct regarding stability?

(a)  (b) 

(c)  (d) 

3. 

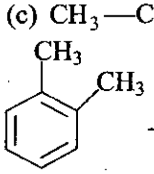
Which of the following reagents can be used for above conversion?

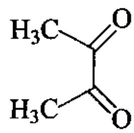
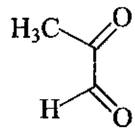
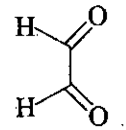
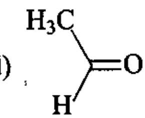
(a) Zn/Δ (b) Mg/Δ (c) NaI/acetone (d) Alc. KOH

4. The correct basicity orders are :

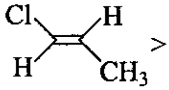
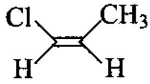
(a) $CH_3—\overset{\ominus}{C}H_2 < H_2C=\overset{\ominus}{C}H$ (b) $CH_3—\overset{\ominus}{C}H_2 > H_2C=\overset{\ominus}{C}H$

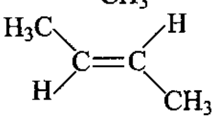
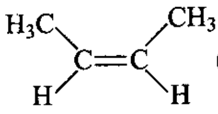
(c) $CH_3—\overset{\ominus}{C}H_2 > HC\equiv\overset{\ominus}{C}$ (d) $H_2C=\overset{\ominus}{C}H > H—C\equiv\overset{\ominus}{C}$

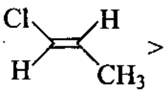
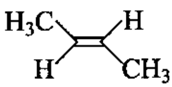
5.  $\xrightarrow[Me_2S]{O_3}$ Products :

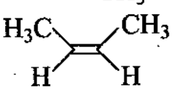
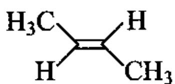
(a)  (b)  (c)  (d) 

6. Choose the correct comparisons :

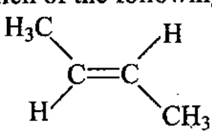
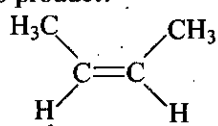
(a)  >  (B.pt)

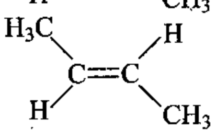
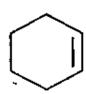
(b)  >  (M.pt)

(c)  >  (Reactivity toward HBr)

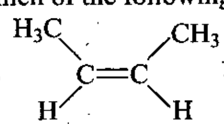
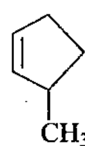
(d)  >  (B.pt)

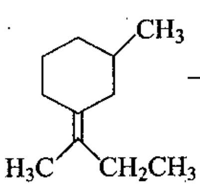
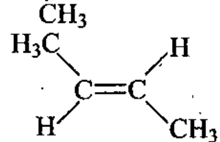
7. Which of the following reactions give meso product?

(a)  $\xrightarrow{Br_2,\ CCl_4}$ (b)  $\xrightarrow{\text{Cold } KMnO_4}$

(c)  $\xrightarrow{\text{Cold } KMnO_4}$ (d)  $\xrightarrow{Br_2,\ CCl_4}$

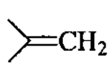
8. Which of the following reactions give diastereomeric products?

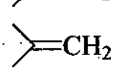
(a)  $\xrightarrow{Br_2,\ H_2O}$ (b)  $\xrightarrow{Br_2,\ CCl_4}$

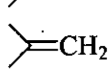
(c)  $\xrightarrow{m\text{-CPBA}}$ (d)  $\xrightarrow{OsO_4}$

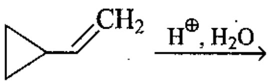
9. Mark out the correct comparisons.

(a) 3°H > 2°H > 1°H (reactivity for bromination)

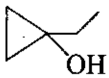
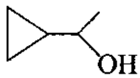
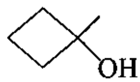
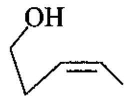
(b)  <  (stability)

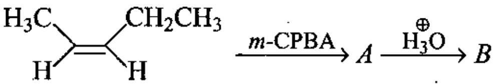
(c)  <  (reactivity toward HBr)

(d)  <  (reactivity for catalytic hydrogenation)

10. 

Products are :

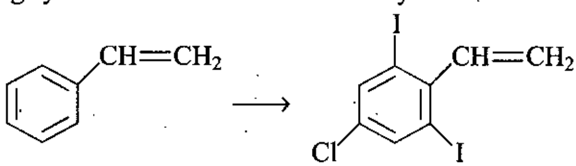
(a)  (b)  (c)  (d) 

11. 

Choose the correct statements regarding above reaction :
(a) Product A is optically active
(b) The conversion of alkene to product B is a stereospecific reaction
(c) Product B has chiral molecule
(d) Formation of 'A' is *syn* addition reaction

12. Which of the following reactions are not feasible?
(a) $HC\equiv CH + KOH \longrightarrow$ (b) $HC\equiv CH + NaNH_2 \longrightarrow$
(c) $HC\equiv CH + NaOH \longrightarrow$ (d) $HC\equiv \overset{\ominus}{C}K^{\oplus} + (CH_3)_3C—Br \longrightarrow$

13. The following synthesis cannot be carried out by :



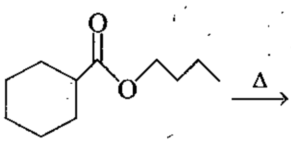
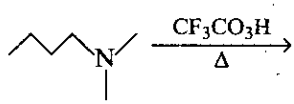
(a) $\xrightarrow{Cl_2} \xrightarrow{ICl/CH_3COOH} \xrightarrow{ICl/CH_3COOH} \xrightarrow{Zn,\ dust}$

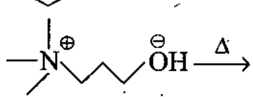
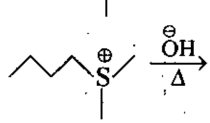
(b) $\xrightarrow{HOCl/H^{\oplus}} \xrightarrow{Cl_2/Fe} \xrightarrow[(excess)]{ICl/ZnCl_2} \xrightarrow{NaOH,\ \Delta}$

(c) $\xrightarrow{HOBr,\ H^{\oplus}} \xrightarrow{Cl_2/Fe} \xrightarrow[(excess)]{ICl/ZnCl_2} \xrightarrow{Zn\ dust,\ CH_3COOH}$

(d) $\xrightarrow{Br_2/CH_3COOH} \xrightarrow{Cl_2/Fe} \xrightarrow[(excess)]{ICl/CH_3COOH} \xrightarrow{NaNH_2}$

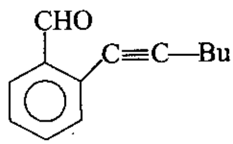
14. 1-butene is formed in reactions :

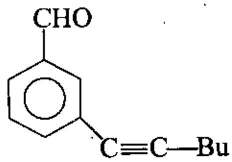
(a)  (b) 

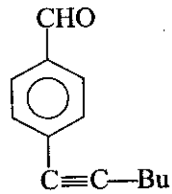
(c)  (d) 

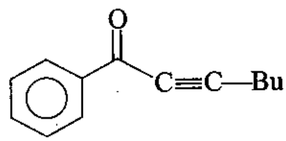
15. $Bu{-}C{\equiv}CH \xrightarrow{NaNH_2} A \xrightarrow[H_2O]{Ph{-}CHO} B \xrightarrow{MnO_2} C$

Compound C of the reaction cannot be :

(a) 

(b) 

(c) 

(d) 

16. Acetone is the major product in :

I $H_2C{=}C{=}CH_2 \xrightarrow{H_3^{\oplus}O}$

II $H_3C{-}C{\equiv}CH \xrightarrow{Hg^{+2}/H_2SO_4}$

III $H_3C{-}C{\equiv}CH \xrightarrow[H_2O_2/\overset{\ominus}{O}H]{BH_3\cdot THF}$

(a) I (b) II (c) III (d) None of these

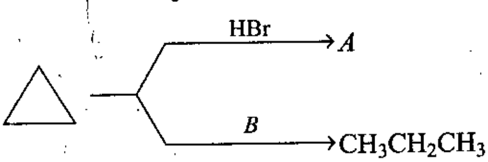
17. Which of the following can be prepared by Wurtz reaction?

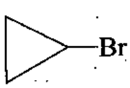
(a) CH_3CH_3

(b) $CH_3CH_2CH_2CH_3$

(c) $H_3C{-}\underset{\displaystyle CH_3}{\underset{|}{CH}}{-}CH_3$

(d) $CH_3{-}CH_2{-}\underset{\displaystyle CH_3}{\underset{|}{CH}}{-}CH_3$

18. 

(a) Compound A is 

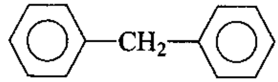
(b) Compound A is $H_3C{-}CH_2{-}CH_2{-}Br$

(c) Reagent B is H_2/Ni at 120°C

(d) Reagent B is $LiAlH_4$

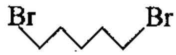
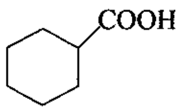
19. Which of the following molecules of alkane will give only one monohalogenated product on reaction with halogen in presence of sunlight?

(a) $H_3C—CH_3$ (b) $H_3C—CH_2—CH_3$

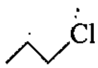
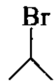
(c) $(H_3C)_4C$ (d) 

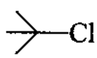
20. Which of the following methods yield saturated hydrocarbon?

(a) $R—CH{=}CH_2 \xrightarrow[CH_3COOH]{BH_3}$ (b) $R—CH{=}CH_2 \xrightarrow[\Delta]{CH_2N_2}$

(c)  $\xrightarrow[\Delta]{\text{Na/ether}}$ (d)  $\xrightarrow[\Delta]{NaOH + CaO}$

21. Which of the following reactions will give result as alkane as major product?

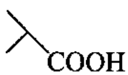
(a)  $\xrightarrow{LiAlH_4}$ (b)  $\xrightarrow{NaBH_4}$

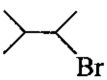
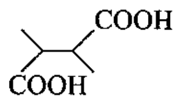
(c)  $\xrightarrow{LiAlH_4}$ (d)  $\xrightarrow{NaBH_4}$

22. Which of the following alkanes cannot be synthesized by the Wurtz reaction in good yield?

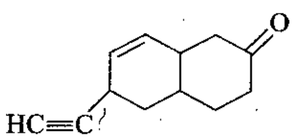
(a)  (b)  (c)  (d) 

23. Which of the following reactions produce the same product?

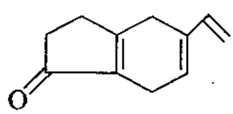
(a)  $\xrightarrow{Br_2, h\nu} \xrightarrow{\text{Na/ether}}$ (b)  $\xrightarrow{NaOH} \xrightarrow{\text{Electrolysis}}$

(c)  $\xrightarrow{\text{Mg/ether}} \xrightarrow{CH_3Br}$ (d)  $\xrightarrow{\text{Red P + HI}}$

24. How will you distinguish compounds *A* and *B* by using laboratory reagent?



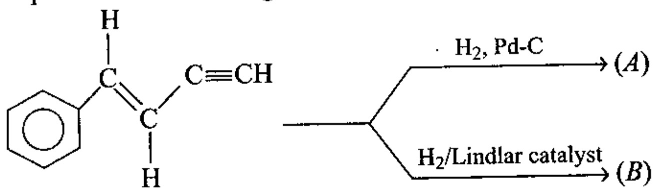
(*A*)



(*B*)

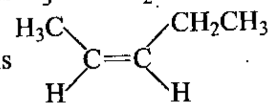
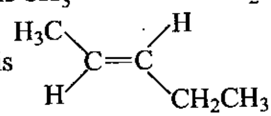
(a) *A* reacts with $AgNO_3/NH_4OH$
(b) *A* reacts with Cu_2Cl_2/NH_4OH
(c) *B* does not react with $AgNO_3/NH_4OH$
(d) *B* reacts with Cu_2Cl_2/NH_4OH

25. Predict the products of following reactions :



(a) A is $Ph—CH_2—CH_2—CH_2—CH_3$
(b) B is $Ph—CH{=}CH—CH{=}CH_2$
(c) A is $Ph—CH{=}CH—CH{=}CH_2$
(d) B is $Ph—CH_2—CH_2—CH{=}CH_2$

26. $H_3C—C{\equiv}CH \xrightarrow[2.\ CH_3CH_2Br]{1.\ NaNH_2} A \xrightarrow[Pd\text{-}BaSO_4]{H_2} B$:

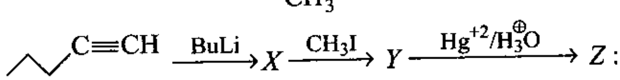
(a) A is $H_3C—CH_2—C{\equiv}CH$
(b) A is $CH_3—C{\equiv}C—CH_2CH_3$
(c) B is 
(d) B is 

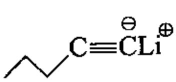
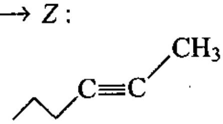
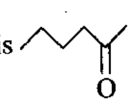
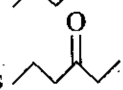
27. $H_3C—C{\equiv}CH \xrightarrow{Hg^{+2}/H_2SO_4} X \xrightarrow{KMnO_4} Y$:

(a) X is $H_3C—C(OH){=}CH_2$
(b) X is $H_3C—C(=O)—CH_3$
(c) Y is $H_3C—C(=O)—OH$
(d) Y is $HCOOH$

28. $H_3C—C{\equiv}CH \xrightarrow{NaNH_2} X \xrightarrow[H_2O]{Acetone} Y \xrightarrow[\Delta]{Conc.\ H_2SO_4} Z$:

(a) X is $H_3C—CH{=}CH—CH_3$
(b) X is $H_3C—C{\equiv}C^{\ominus}Na^{\oplus}$
(c) Y is $H_3C—C{\equiv}C—C(OH)(CH_3)—CH_3$
(d) Z is $H_3C—C{\equiv}C—C(CH_3){=}CH_2$

29. 

(a) X is 
(b) Y is 
(c) Z is 
(d) X is 

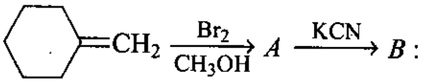
30. Which of the following solubility orders in water are correct?

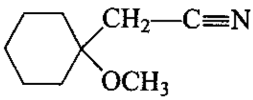
(a) $H_3C—C\equiv CH < H_3C—O—CH_3$

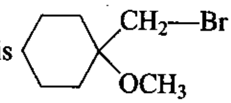
(b) $H_3C—C\equiv CH > CH_3—O—CH_3$

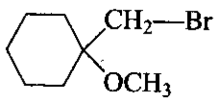
(c) $H_2C=CH—CH_3 < H_3C—CH_2—CH_3$

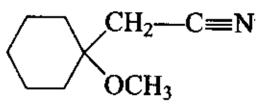
(d) $H_2C=CH—CH_3 > CH_3CH_2CH_3$

31. 

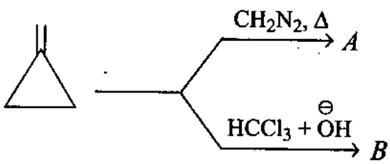
(a) A is 

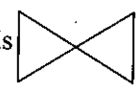
(b) B is 

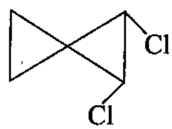
(c) A is 

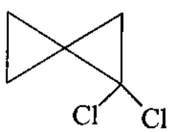
(d) B is 

32. Write the products of the following reaction :

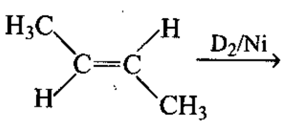


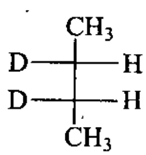
(a) A is 

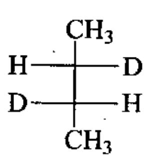
(b) A is 

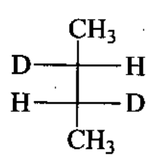
(c) B is 

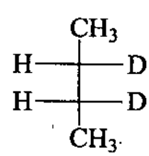
(d) B is 

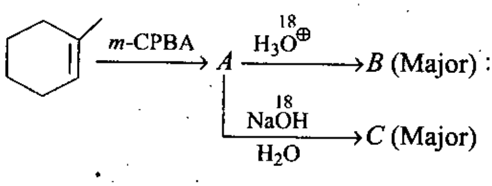
33. 

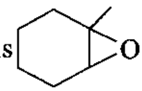
(a) 

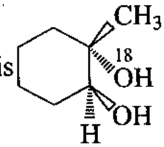
(b) 

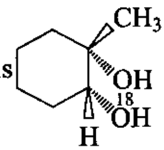
(c) 

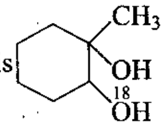
(d) 

34. 

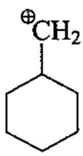
(a) A is 

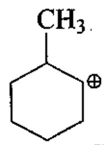
(b) B is 

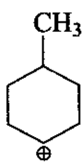
(c) B is 

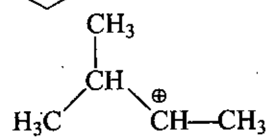
(d) C is 

35. Which of the following carbocations would you expect to rearrange?

(a) 

(b) 

(c) 

(d) 

36. Select the correct statements :

(a) addition of Br_2 on *trans*-2-butene gives erythro product

(b) addition of Cl_2 on *cis*-2-butene gives threo product

(c) addition of Br_2 on *cis*-2-butene gives racemic mixture

(d) addition of D_2 on *cis*-2-butene gives meso product

37. Which of the following will give allyl halide?

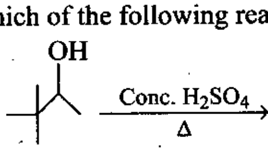
(a) $H_2C{=}CH{-}CH_3 \xrightarrow[hv]{SO_2Cl_2}$

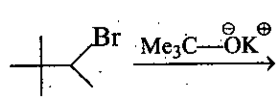
(b) $H_2C{=}CH{-}CH_3 \xrightarrow{Cl_2,\ 800K}$

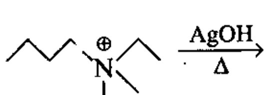
(c) $H_2C{=}CH{-}CH_3 \xrightarrow{NBS}$

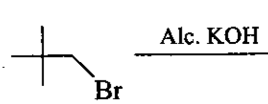
(d) $H_3C{-}CH{=}CH_2 + HBr \xrightarrow{H_2O_2}$

38. Which of the following reactions will give least substituted alkene?

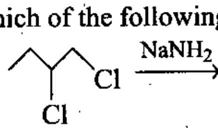
(a) 

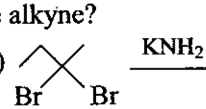
(b) 

(c) 

(d) 

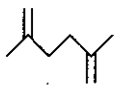
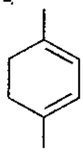
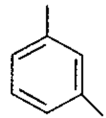
39. Which of the following reactions will give alkyne?

(a) 

(b) 

(c) $H_3C-CBr_2-CBr_2-CH_3 \xrightarrow{Zn,\ \Delta}$ (d) $H_3C-C\equiv CH \xrightarrow{Hg^{+2},\ H_2SO_4}$

40. An organic compound on reaction with O_3 followed by Zn and H_2O gives $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-CH_3$. The structures are :

(a)  (b)  (c)  (d) 

41. Which of the following reactions are correctly represented?

(a) $R-CH=CH_2 + HCl \longrightarrow R-\underset{Cl}{\underset{|}{CH}}-CH_3$

(b) $R-CH=CH_2 + HI \xrightarrow[h\nu]{H_2O_2} R-CH_2-CH_2-I$

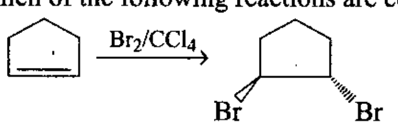
(c) $R-CH=CH_2 + HBr \xrightarrow[h\nu]{H_2O_2} R-CH_2-CH_2-Br$

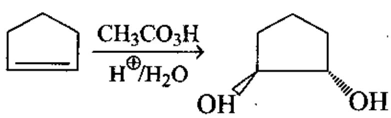
(d) $R-CH=CH_2 + HI \xrightarrow[h\nu]{H_2O_2} R-\overset{I}{\overset{|}{C}H}-CH_3$

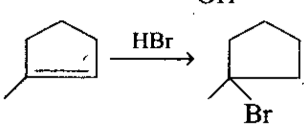
42. Which of the following give allylic substitution product?

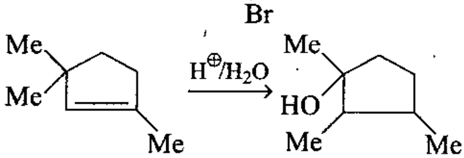
(a)  $\xrightarrow{NBS/h\nu}$ (b)  $\xrightarrow[\Delta]{SeO_2}$ (c)  $\xrightarrow{OsO_4}$ (d)  $\xrightarrow[h\nu]{SO_2Cl_2}$

43. Which of the following reactions are correct?

(a) 

(b) 

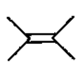
(c) 

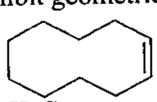
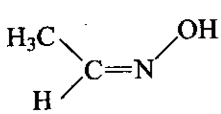
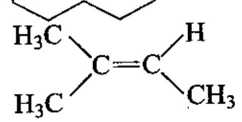
(d) 

44. Which of the following are correct for the addition of X_2 on alkene?
(a) Reaction involves cyclic halonium ion as intermediate
(b) Reaction involves carbocation intermediate
(c) Addition is anti addition reaction
(d) *Trans* alkene (Symmetrical) gives meso product

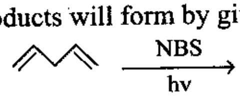
45. Which of the following will react with 1-butyne?
(a) $AgNO_3 + NH_4OH$
(b) $Cu_2Cl_2 + NH_4OH$
(c) Na
(d) $KMnO_4/\overset{\ominus}{O}H$

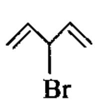
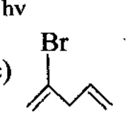
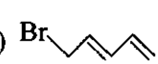
46. Which of the following do not give rearrangement of carbocation in the addition reaction of alkene?
(a) Br_2/CCl_4
(b) HBr
(c) HBr/H_2O_2, hv
(d) OsO_4

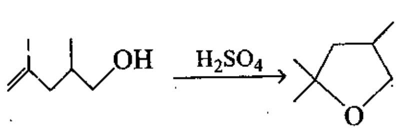
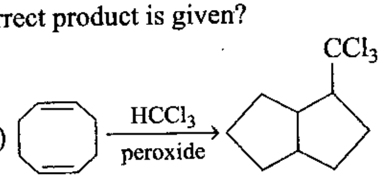
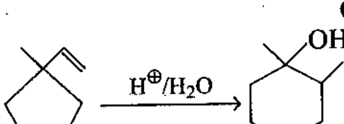
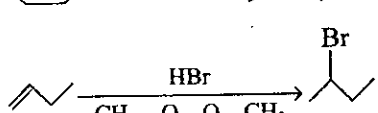
47. Which of the following will give acetone?
(a) $H_3C—C\equiv CH \xrightarrow{Hg^{+2}, H_2SO_4}$
(b) $CH_3—C\equiv CH \xrightarrow[\overset{\ominus}{O}H, H_2O]{B_2H_6}$
(c)  $\xrightarrow[\overset{\ominus}{O}H]{KMnO_4, \Delta}$
(d) $HC\equiv CH + CH_3OH \longrightarrow$

48. Which of the following compounds can exhibit geometrical isomerism?
(a) $H_3C—CH_2—CH=CH—CH_3$
(b) 
(c) 
(d) 

49. Which of the following products will form by given reaction?



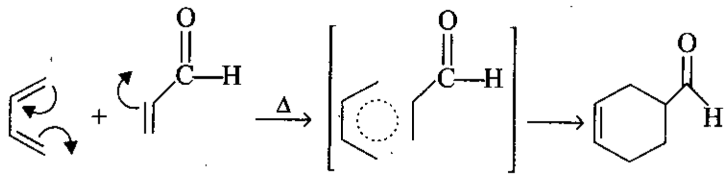
(a) 
(b) HBr
(c) 
(d) 

50. In which of the following reactions the correct product is given?
(a) 
(b) 
(c) 
(d) 

EXERCISE-3 LINKED COMPREHENSION TYPE

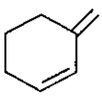
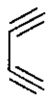
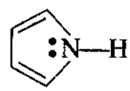
Passage-1

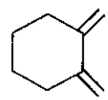
Conjugated diene reacts with unsaturated hydrocarbon in presence of heat to produce six membered cyclic product, this reaction is known as Diels-Alder reaction. For this reaction conjugated diene should be in cisiod form. Aromatic hydrocarbon do not give Diels-Alder reaction :



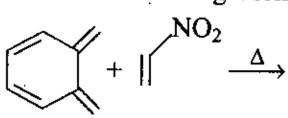
Diene Dienophile Intermediate

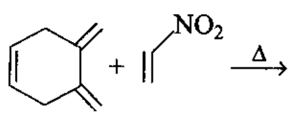
1. Which of the following conjugated unsaturated hydrocarbons will give Diels-Alder reaction?

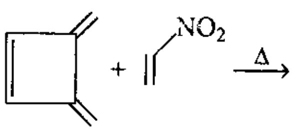
(a)  (b)  (c) 

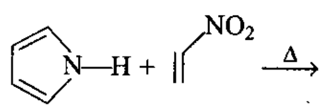
(d) 

2. Which of the following Diels-Alder reactions is fastest?

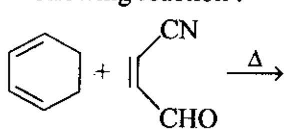
(a) 

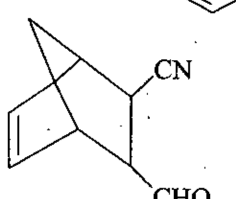
(b) 

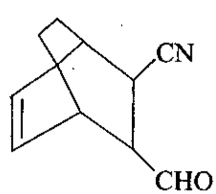
(c) 

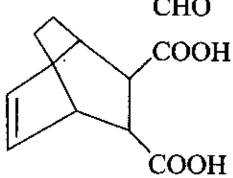
(d) 

3. Find the product of following reaction :



(a) 

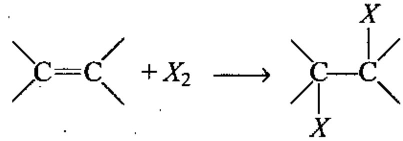
(b) 

(c) 

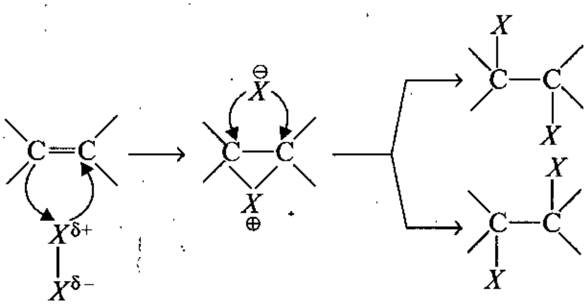
(d) No reaction

Passage-2

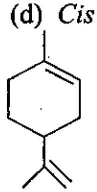
Addition of X_2 on alkene is electrophilic addition reaction. Reaction proceed through the formation of 3-membered cyclic halonium ion. Nucleophile $X^{\ominus}$ attacks from backside of cyclic halonium ion hence total reaction is anti addition reaction. If this reaction proceed in polar solvent then solvent itself acts as nucleophile.

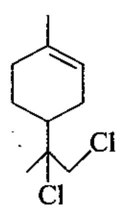
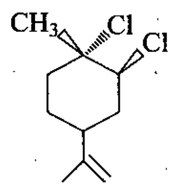
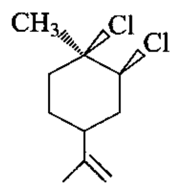
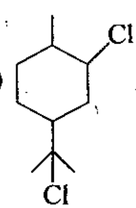


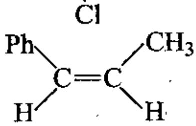
Mechanism :

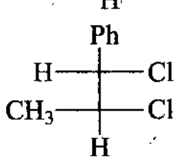
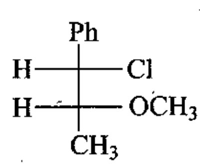


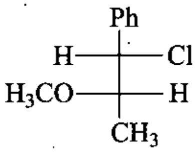
4. Which of the following statements is incorrect?
   (a) Symmetrical *trans* alkene gives 2 products on reaction with Br_2/CCl_4
   (b) Symmetrical *cis* alkene gives 2 products on reaction with Br_2/CCl_4
   (c) *Trans* alkenes give erythro product
   (d) *Cis* alkenes give threo product

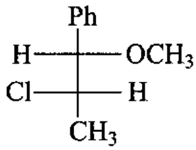
5.  $\xrightarrow[CCl_4]{Cl_2\ (1\ Mole)}$

(a) 
(b) 
(c) 
(d) 

6.  $\xrightarrow{Cl_2,\ CH_3OH}$ Major product :

(a) 
(b) 

(c) 

(d) 

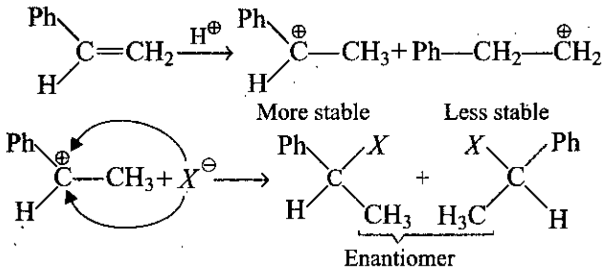
Passage-3

Addition of HX on alkene proceed through the formation of carbocation. This reaction is also known as Markownikoff reaction. According to Markownikoff's rule addition of electrophile occurs on that carbon of alkene which have more number of 'H' atom.

$$\mathrm{Ph{-}CH{=}CH_2} \xrightarrow{HX} \underset{\text{Major}}{\mathrm{Ph{-}\overset{\displaystyle X}{\overset{|}{C}}H{-}CH_3}} + \underset{\text{Minor}}{\mathrm{Ph{-}CH_2{-}CH_2{-}}X}$$

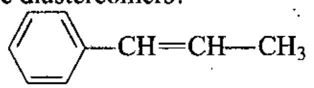
Mechanism :

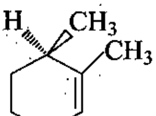
$$\mathrm{H{-}}X \rightleftharpoons \mathrm{H^{\oplus}} + X^{\ominus}$$



7. Which of the following alkenes can produce diastereomers?

(a) $CH_3{-}CH{=}CH{-}CH_3$

(b) 

(c) 

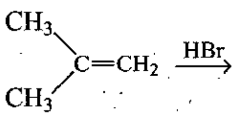
(d) $CH_3{-}CH{=}CH_2$

8. Which of the following alkenes will give Markownikoff reaction?

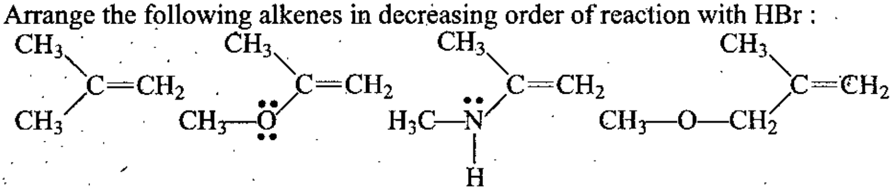
(a) $F_3C{-}CH{=}CH_2 \xrightarrow{HCl}$

(b) $H_3^{\oplus}N{-}CH{=}CH_2 \xrightarrow{HCl}$

(c) $O_2N{-}CH{=}CH_2 \xrightarrow{HBr}$

(d) 

9. Arrange the following alkenes in decreasing order of reaction with HBr :



(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $R > Q > P > S$ (c) $S > R > Q > P$ (d) $Q > R > P > S$

Passage-4

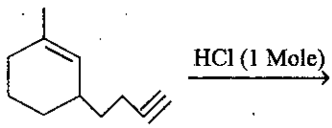
Alkene and alkyne both undergo electrophilic addition because of π electron density, they behave as electron rich species, alkenes are more reactive toward this reaction because the intermediate formed when an $E^{\oplus}$ adds to an alkyne is a vinylic cation whereas the intermediate formed when an $E^{\oplus}$ adds to alkene is alkyl cation, which is more stable.

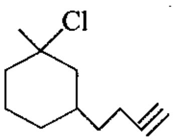
$$R{-}C{\equiv}C{-}H \xrightarrow{E^{\oplus}} R{-}\overset{\oplus}{C}{=}CH$$

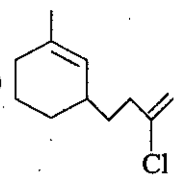
Vinyl cation

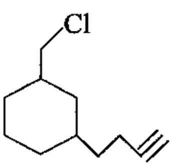
$$R{-}CH{=}CH_2 \xrightarrow{E^{\oplus}} R{-}\overset{\oplus}{C}H{-}CH_3$$

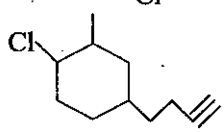
Alkyl cation

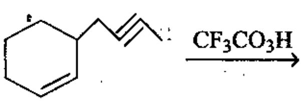
10. 

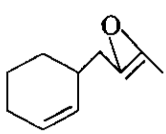
(a) 

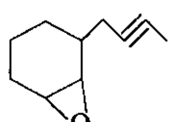
(b) 

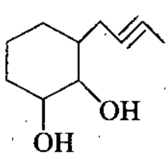
(c) 

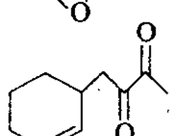
(d) 

11. 

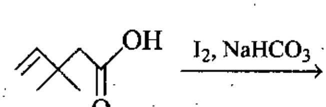
(a) 

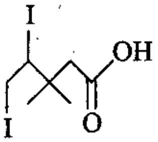
(b) 

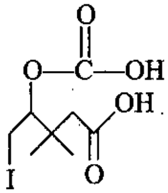
(c) 

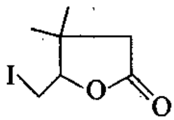
(d) 

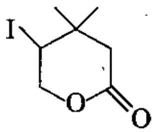
12. In the reaction :



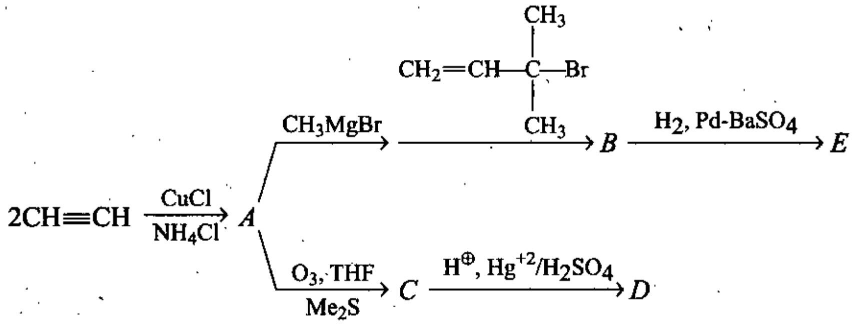
(a) 

(b) 

(c) 

(d) 

Passage-5



13. Find structure of compound A :

(a) $CH_2=CH-CH(Cl)-CH_3$

(b) $H_2C=CH-CH=CH_2$

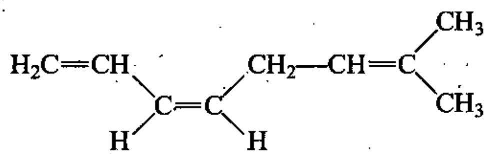
(c) $HC\equiv C-C\equiv CH$

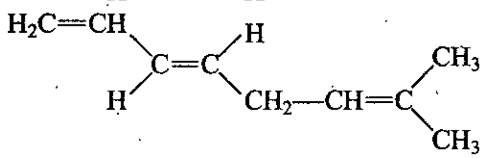
(d) $H_2C=CH-C\equiv CH$

14. Find structure of compound E :

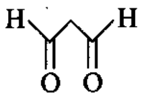
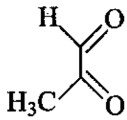
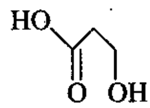
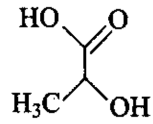
(a) $H_2C=CH-C\equiv C-CH_2-CH=C(CH_3)_2$

(b) $H_3C-CH_2-C\equiv C-CH_2-CH=C(CH_3)_2$

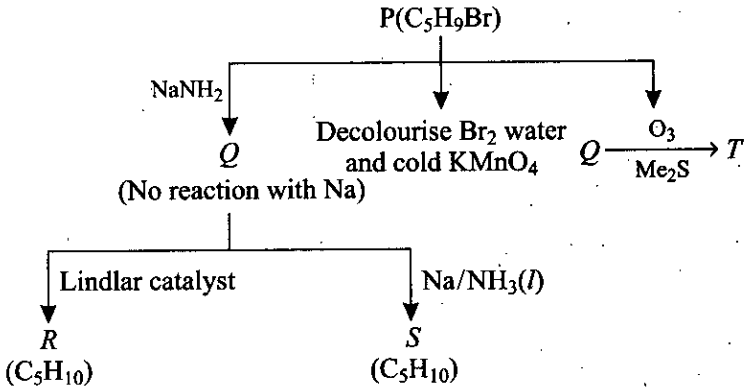
(c) 

(d) 

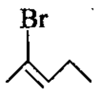
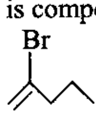
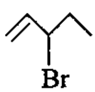
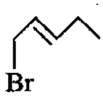
15. Find structure of compound D :

(a)  (b)  (c)  (d) 

Passage-6



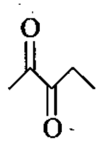
16. Which of the following is compound P?

(a)  (b)  (c)  (d) 

17. R and S are :

(a) position isomers (b) enantiomers
(c) geometrical isomers (d) functional group isomers

18. Identify structure of compound T :

(a) $CH_3—\overset{\overset{\large O}{\|}}{C}—OH$ (b) 

(c) $CH_3—CH_2—\underset{\underset{\large O}{\|}}{C}—OH$ (d) $CH_3—\underset{\underset{\large O}{\|}}{C}—H$

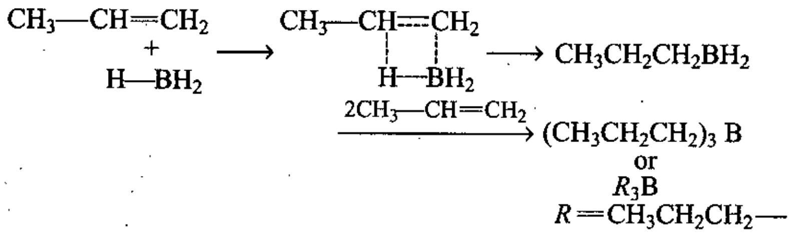
Passage-7

Hydroboration oxidation reaction is a process of addition of H_2O according to Anti-Markownikoff's rule.

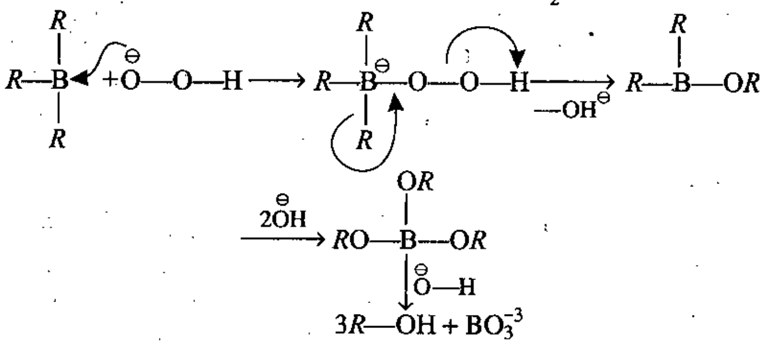
$$CH_3CH{=}CH_2 \xrightarrow[H_2O_2,\ \overset{\ominus}{O}H]{BH_3.THF} CH_3—CH_2—CH_2—OH$$

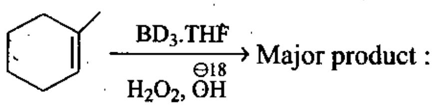
Reaction is regioselective. Regioselectivity of reaction is increased by using hindered boranes.

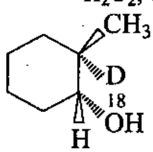
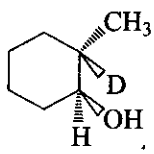
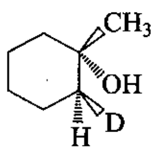
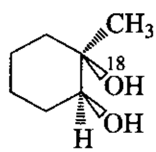
THF (Tetrahydrofuran) is used to control reactivity of borane.

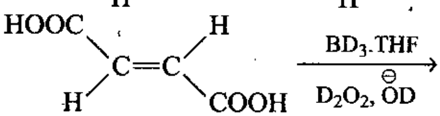


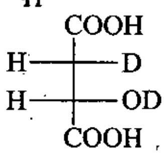
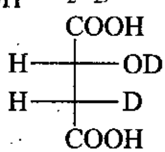
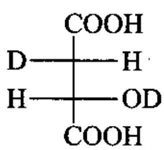
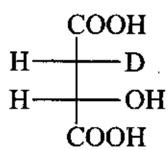
$$H-O-O-H + \overset{\ominus}{O}H \longrightarrow \overset{\ominus}{O}-O-H + H_2O$$



19. 

(a)  (b)  (c)  (d) 

20. 

(a)  (b)  (c)  (d) 

21. $CH_3-C\equiv CH \xrightarrow[H_2O_2, \overset{\ominus}{O}H]{BH_3.THF}$ Major product :

(a) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$

(b) $\underset{\underset{\displaystyle OH}{|}}{CH_2}-CH=CH_2$

(c) $CH_3-\overset{\overset{\displaystyle OH}{|}}{CH}=CH_2$

(d) $CH_3-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-H$

Passage-8

Alkane may be prepared from alkyl halide by Wurtz method where alkyl halide reacted with Na in presence of ether.

$$2R\text{—}X \xrightarrow[\Delta]{\text{Ether}} R\text{—}R + 2\text{Na}X.$$

Mechanism :

$$2\text{Na} \longrightarrow 2\text{Na}^{\oplus} + 2e^-$$

$$2e^- + R\text{—}X \longrightarrow R^{\ominus} + X^{\ominus}$$

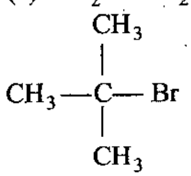
$$R^{\ominus} + R\text{—}X \longrightarrow R\text{—}R + X^{\ominus}$$

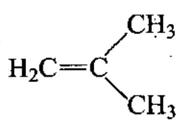
$$2\text{Na}^{\oplus} + 2X^{\ominus} \longrightarrow 2\text{Na}X$$

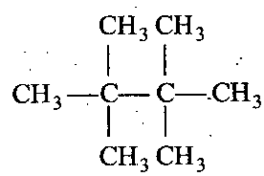
22. $CH_3CH_2\text{—}Cl \xrightarrow[\Delta]{\text{Na/ether}}$

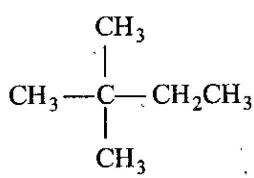
Which of the following products may not be formed?

(a) $CH_3\text{—}CH_3$ (b) $CH_3\text{—}CH_2\text{—}CH_2\text{—}CH_3$
(c) $CH_2{=}CH_2$ (d) CH_4

23.  $\xrightarrow[\Delta]{\text{Na/ether}}$ Major product :

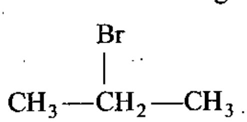
(a) 

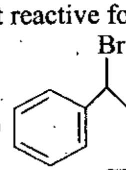
(b) 

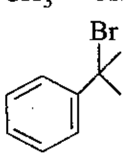
(c) 

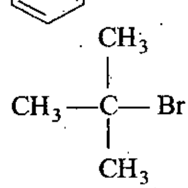
(d) No reaction

24. Which of the following compounds is most reactive for Wurtz reaction?

(a) 

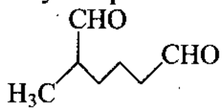
(b) 

(c) 

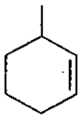
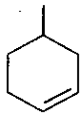
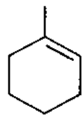
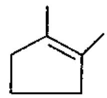
(d) 

Passage-9

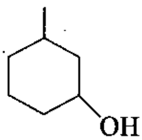
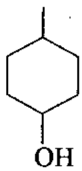
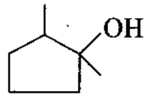
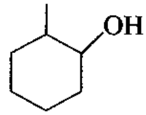
Hydrocarbon A (C_7H_{12}) was treated with BH_3.THF; H_2O_2, NaOH to produce B($C_7H_{14}O$) as only product. Reaction of B with TsCl/pyridine followed by KOH gives C (isomeric with A) in addition to the olefinic products. Treatment of C with ozone followed by Zn/AcOH produces only compound shown below :



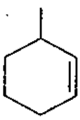
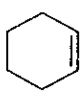
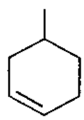
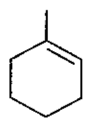
25. What is correct structure of 'A'?

(a)  (b)  (c)  (d) 

26. What is correct structure of 'B'?

(a)  (b)  (c)  (d) 

27. What is correct structure of compound 'C'?

(a)  (b)  (c)  (d) 

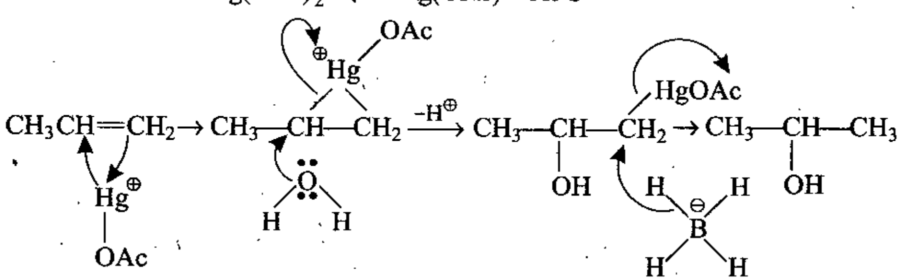
Passage-10

Oxymercuration demercuration reaction is process of addition H_2O according to Markownikoff's rule without any rearrangement.

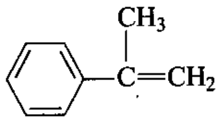
$$CH_3—CH{=}CH_2 \xrightarrow[NaBH_4,\ \overset{\ominus}{O}H]{Hg(OAc)_2,\ H_2O} CH_3—\underset{}{\overset{OH}{\overset{|}{C}}}H—CH_3$$

Mechanism :

$$Hg(OAc)_2 \rightleftharpoons \overset{\oplus}{Hg}(OAc) + Ac\overset{\ominus}{O}$$



Base $\overset{\ominus}{O}H$ is used to neutralise $H^{\oplus}$ produced during the reaction :

28.  $\xrightarrow[NaBD_4,\ \overset{\ominus}{O}H]{Hg(OAc)_2,\ H_2O}$ Major product :

(a) $Ph-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$

(b) $Ph-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2D$

(c) $Ph-\underset{\underset{D}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-OH$

(d) $Ph-\underset{\underset{OD}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2D$

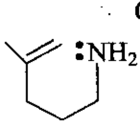
29. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH=CH_2 \xrightarrow[NaBH_4,\ \overset{\ominus}{O}H]{Hg(OAc)_2,\ CH_3OH}$ Product :

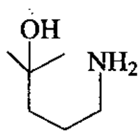
(a) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{OCH_3}{|}}{C}}-\overset{\overset{CH_3}{|}}{CH}-CH_3$

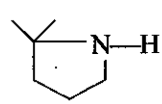
(b) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\overset{\overset{OH}{|}}{CH}-CH_3$

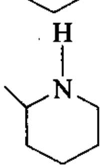
(c) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\overset{\overset{OCH_3}{|}}{CH}-CH_3$

(d) No reaction

30.  $\xrightarrow[NaBH_4,\ \overset{\ominus}{O}H]{Hg(OAc)_2}$

(a) 

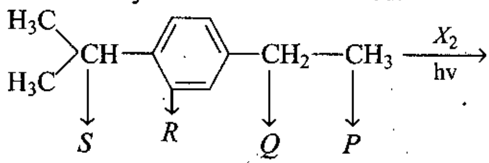
(b) 

(c) 

(d) Both (a) and (b)

Passage-11

Free radical substitution chalcogenation is shown by the compounds having at least one H-atom an sp^3-hybridised carbon atom. Here substitution is due to free radical formation in presence of sunlight or heat or peroxide. The abstruction of H-atom is on the basis of stability of free radical formed.



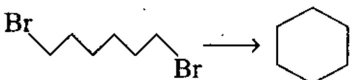
31. Which of the above hydrogen can be abstracted easily by halogen in presence of sunlight?
(a) P (b) Q (c) R (d) S

32. In the above reaction how many monobrominated products are possible?
(a) 3 (b) 4 (c) 5 (d) 7

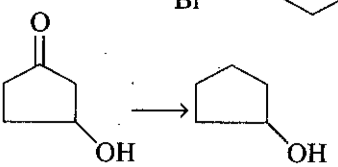
33. Which of these H-atom can be substituted to get an optically active halide?
(a) P (b) Q (c) R (d) S

EXERCISE-4 MATRIX MATCH TYPE

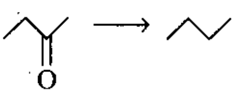
1. **Column (I)** **Column (II)**

(a) 

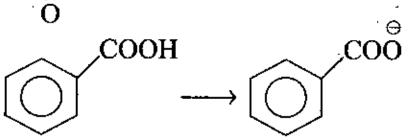
P. Red P + HI

(b) 

Q. Na/ether

(c) 

R. $NH_2—NH_2/\overset{\ominus}{O}H$

(d) 

S. Zn-Hg/HCl

2. **Column (I)** **Column (II)**

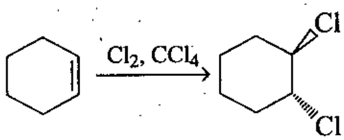
(a) $2CH_3—\underset{\underset{CH_3}{|}}{CH}—X \longrightarrow CH_3—\underset{\underset{CH_3}{|}}{CH}—\overset{\overset{CH_3}{|}}{CH}—CH_3$ P. $LiAlH_4$

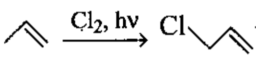
(b) $\begin{matrix} CH_2—X \\ | \\ CH_2—X \end{matrix} \longrightarrow \begin{matrix} CH_2 \\ \| \\ CH_2 \end{matrix}$ Q. Na, dry ether

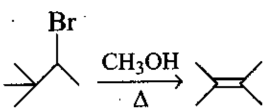
(c) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-X \longrightarrow CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH_2}}$ — *R*. Mg, dry ether

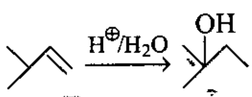
(d) $CH_3-\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}-X \longrightarrow CH_2=C(CH_3)_2$ — *S*. Zn/Δ

3. Column (I) **Column (II)**

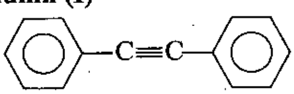
(a)  *P*. Rearrangement

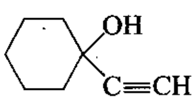
(b)  *Q*. Carbocation

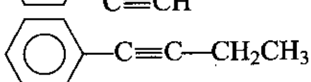
(c)  *R*. Free radical

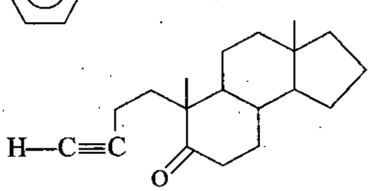
(d)  *S*. Cyclic transition state

4. Column (I) **Column (II)**

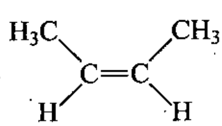
(a)  *P*. Reacts with H_2-Pd/$CaCO_3$

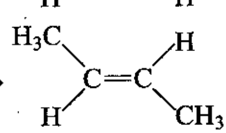
(b)  Q. *Trans* alkene will form when reacted with Na/Liq. NH_3

(c)  *R*. Reacts with ammoniacal $AgNO_3$

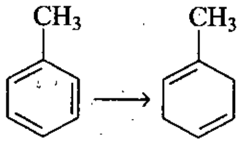
(d)  *S*. On oxidative ozonolysis produces CO_2

5. Column (I) **Column (II)**

(a) $H_3C-C\equiv C-CH_3 \longrightarrow$  *P*. H_2, Pd-$BaSO_4$

(b) $H_3C-C\equiv C-CH_3 \longrightarrow$  *Q*. Li, Liq. NH_3

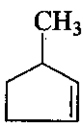
(c) $H_3C—CH=CH—CH_3 \longrightarrow H_3C—CH_2—CH_2—CH_3$ R. $HN=NH, \Delta$

(d)  S. B_2H_6, CH_3COOH

6. Column (I) **Column (II)**

(a) $\underset{CH_3CH_2}{\overset{Ph}{\diagdown}}C=CH_2 \xrightarrow{HBr}$ P. Free radical

(b) $H—\overset{CH_3}{\underset{\underset{CH_2}{\overset{\|}{CD}}}{C}}—D \xrightarrow{HCl}$ Q. Enantiomer

(c)  $\xrightarrow{NBS}$ R. Diastereomer

(d) $\underset{H_3C}{\overset{Ph}{\diagdown}}C=CH_2 \xrightarrow[H_2O_2,\ hv]{HBr}$ S. Carbocation

7. Column (I) **Column (II)**

(a) $\underset{H_3C}{\overset{H_3C}{\diagdown}}C=CH—CH_3 \xrightarrow[Ag_2O]{O_3}$ P. Reduction

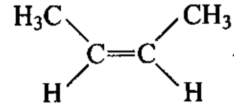
(b) $H_3C—C\equiv CH \xrightarrow{Hg^{+2},\ H_2SO_4}$ Q. $CH_3—\overset{O}{\overset{\|}{C}}—CH_3$

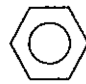
(c) $H_3C—\overset{O}{\overset{\|}{C}}—CH_3 \xrightarrow{\text{Red P + HI}}$ R. Oxidation reaction

(d) $H_3C—\underset{Cl}{\underset{|}{CH}}—CH_2—\overset{O}{\overset{\|}{C}}—CH_3 \xrightarrow[\Delta]{N_2H_4,\ \overset{\ominus}{O}H}$ S. 

8. Column (I) **Column (II)**

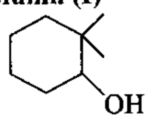
(a) Markownikoff product P. $CH_3—CH=CH_2 \xrightarrow[H_2O_2,\ hv]{HBr}$

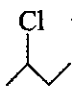
(b) Anti-Markownikoff product — *Q*.  $\xrightarrow{CHCl_3 + KOH}$

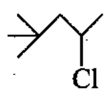
(c) Peroxide effect — *R*.  $-CH=CH_2 \xrightarrow{HCl}$

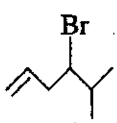
(d) Mixture of stereoisomers — *S*. $CF_3-CH=CH_2 \xrightarrow{HBr}$

9. Column (I) | **Column (II)**

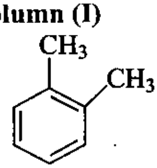
(a)  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$ — *P*. Hofmann's alkene

(b)  $\xrightarrow{C_2H_5\overset{\ominus}{O}/C_2H_5OH}$ — *Q*. Saytzeff's alkene

(c)  $\xrightarrow{Me_3C\overset{\ominus}{O}K^{\oplus}}$ — *R*. Transition state

(d)  $\xrightarrow{\text{Alc. KOH}}$ — *S*. Carbocation

10. Column (I) | **Column (II)**

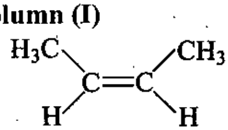
(a)  $\xrightarrow[Me_2S]{O_3}$ — *P*. 3 different products

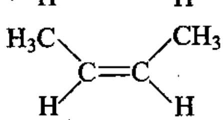
(b) $(H_3C)_2C=CH-CH_2-CH=CH_2 \xrightarrow[Ag_2O]{O_3}$ — *Q*. CO_2 will produce

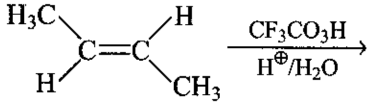
(c) $H_3C-C\equiv CH \xrightarrow[Ag_2O]{O_3}$ — *R*. Oxidative ozonolysis

(d) $H_3C-CH=C=CH_2 \xrightarrow[Zn\text{-}H_2O]{O_3}$ — *S*. Reductive ozonolysis

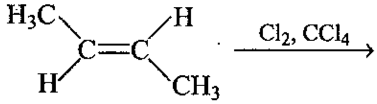
11. Column (I) | **Column (II)**

(a)  $\xrightarrow{\text{Cold } KMnO_4}$ — *P*. Racemic mixture

(b)  $\xrightarrow{Br_2, CCl_4}$ — *Q*. Erythro

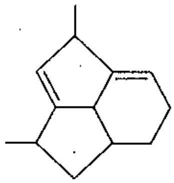
(c) 

R. Threo

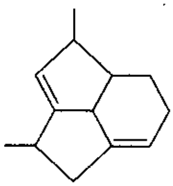
(d) 

S. Meso product

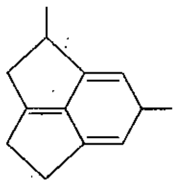
12. Column (I) **Column (II)**

(a) 

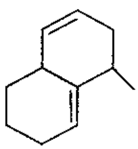
P. Dicarboxylic acid will be formed when reacts with not alkaline $KMnO_4$.

(b) 

Q. Decolourise Br_2/H_2O.

(c) 

R. Dicarboxylic acid and will be formed when reacts with O_3/H_2O_2.

(d) 

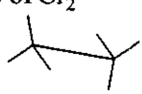
S. Number of allylic hydrogen is odd.

EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

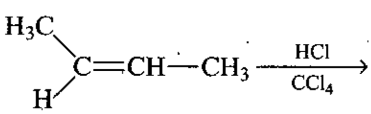
1. Find out number of dimerize products obtain by following reaction.

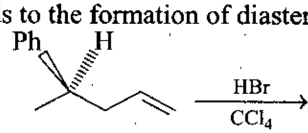
$$H_3C—Cl + H_3C—CH_2—Cl + H_3C—CH_2—CH_2—Cl \xrightarrow[\text{Dry ether}]{\text{Na}}$$

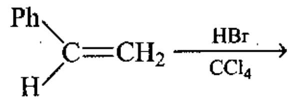
2. How many mono chlorinated products may be obtained when the alkane shown below is heated in the presence of Cl_2

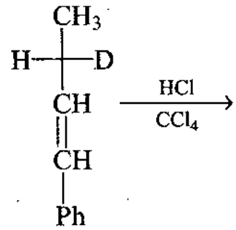


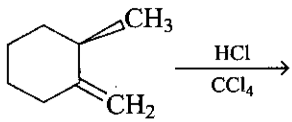
3. How many of the following reactions, leads to the formation of diastereomers.

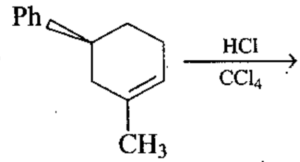
(a) 

(b) 

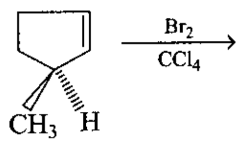
(c) 

(d) 

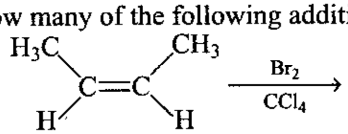
(e) 

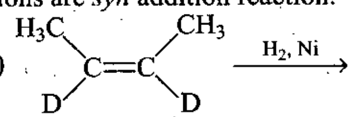
(f) 

4. Identify number of chiral centers present in product obtained by following reaction.



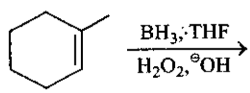
5. How many of the following addition reactions are *syn* addition reaction.

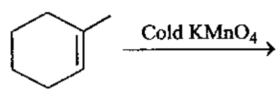
(a) 

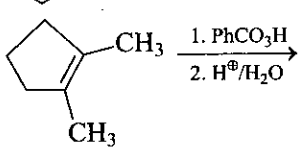
(b) 

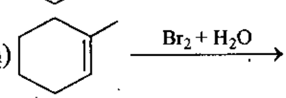
(c) $H_3C-C\equiv C-CH_3 \xrightarrow{H_2,\ Pd-BaSO_4}$

(d) $H_3C-C\equiv C-CH_3 \xrightarrow{Na,\ Liq.\ NH_3}$

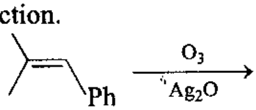
(e) 

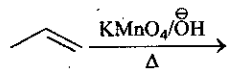
(f) 

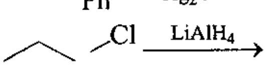
(g) 

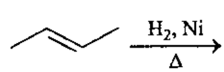
(h) 

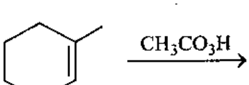
6. Of the following reactions how many reactions are considered as oxidation reaction.

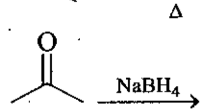
(a) 

(b) 

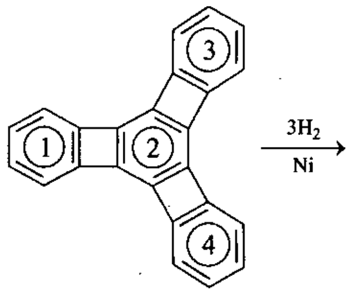
(c) 

(d) 

(e) 

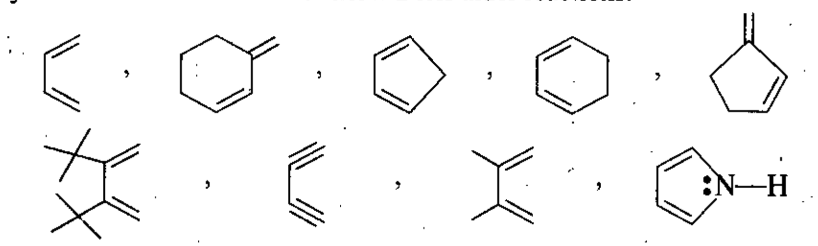
(f) 

7.

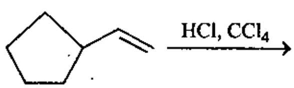


In this reaction which ring will be reduced, by hydrogenation.

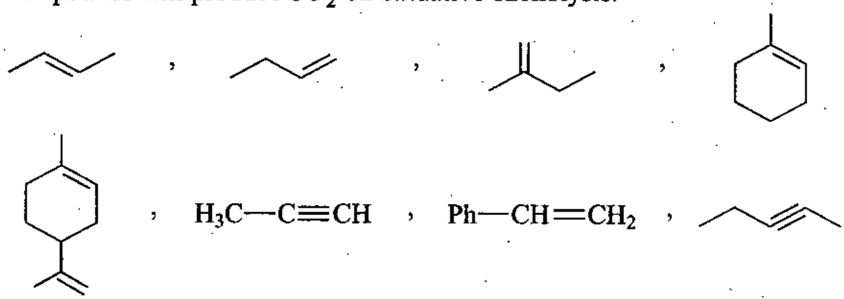
8. Of the following compound, find out numbers of conjugated unsaturated hydrocarbon those would not show Diels alder reactions.



9. How many different products (excluding stereoisomer) can be obtained by following reaction.



10. Examine the structural formulas of following compounds and find how many compounds will produce CO_2 on oxidative ozonolysis.



ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (a)	2. (b)	3. (a)	4. (b)	5. (b)	6. (b)	7. (b)	8. (b)	9. (c)	10. (c)
11. (b)	12. (b)	13. (a)	14. (d)	15. (a)	16. (c)	17. (c)	18. (d)	19. (d)	20. (b)
21. (c)	22. (d)	23. (b)	24. (b)	25. (c)	26. (b)	27. (a)	28. (c)	29. (a)	30. (d)
31. (a)	32. (d)	33. (c)	34. (a)	35. (b)	36. (a)	37. (c)	38. (b)	39. (a)	40. (d)
41. (d)	42. (c)	43. (d)	44. (a)	45. (a)	46. (c)	47. (b)	48. (d)	49. (b)	50. (c)

Level-2

1. (c)	2. (b)	3. (c)	4. (c)	5. (a)	6. (c)	7. (d)	8. (d)	9. (b)	10. (a)
11. (a)	12. (b)	13. (c)	14. (c)	15. (d)	16. (d)	17. (b)	18. (b)	19. (d)	20. (d)
21. (c)	22. (a)	23. (c)	24. (b)	25. (a)	26. (d)	27. (c)	28. (c)	29. (b)	30. (d)
31. (c)	32. (a)	33. (a)	34. (d)	35. (d)	36. (a)	37. (b)	38. (b)	39. (b)	40. (d)
41. (a)	42. (b)	43. (c)	44. (c)	45. (c)	46. (a)	47. (d)	48. (a)	49. (b)	50. (b)
51. (c)	52. (d)	53. (c)	54. (a)	55. (c)	56. (b)	57. (b)	58. (b)	59. (c)	60. (c)
61. (a)	62. (c)	63. (a)	64. (c)	65. (b)	66. (b)	67. (c)	68. (a)	69. (b)	70. (c)
71. (b)	72. (b)	73. (c)	74. (d)	75. (b)	76. (c)	77. (b)	78. (a)	79. (d)	80. (a)
81. (b)	82. (a)	83. (c)	84. (b)	85. (c)	86. (a)	87. (b)	88. (c)	89. (d)	90. (b)
91. (c)	92. (a)	93. (c)	94. (d)	95. (c)	96. (b)	97. (c)	98. (a)	99. (c)	100. (b)
101. (a)	102. (b)	103. (d)	104. (d)	105. (a)	106. (c)	107. (a)	108. (b)	109. (c)	110. (d)
111. (a)	112. (c)	113. (d)	114. (d)	115. (b)	116. (c)	117. (b)	118. (a)	119. (c)	120. (c)
121. (b)	122. (d)	123. (b)	124. (a)	125. (c)	126. (a)	127. (d)	128. (c)	129. (a)	130. (b)
131. (c)	132. (b)	133. (b)	134. (a)	135. (d)	136. (c)	137. (b)	138. (c)	139. (a)	140. (b)
141. (c)	142. (c)	143. (d)	144. (a)	145. (d)	146. (b)	147. (b)	148. (c)	149. (b)	150. (c)
151. (d)	152. (a)	153. (b)	154. (c)	155. (b)	156. (b)	157. (d)	158. (c)	159. (a)	160. (c)
161. (a)	162. (d)	163. (a)	164. (d)	165. (a)	166. (c)	167. (b)	168. (c)	169. (d)	170. (a)
171. (c)	172. (c)	173. (a)	174. (b)	175. (c)	176. (b)	177. (d)	178. (d)	179. (b)	180. (d)
181. (c)	182. (d)	183. (a)	184. (b)	185. (b)	186. (d)	187. (b)	188. (d)	189. (d)	190. (b)
191. (c)	192. (c)	193. (c)	194. (b)	195. (d)	196. (b)	197. (a)	198. (c)	199. (b)	200. (c)
201. (d)	202. (a)	203. (c)	204. (d)	205. (b)	206. (b)	207. (a)	208. (c)	209. (c)	210. (a)
211. (c)	212. (a)	213. (b)	214. (c)	215. (c)	216. (b)	217. (a)	218. (b)	219. (d)	220. (b)
221. (c)	222. (a)	223. (c)	224. (a)	225. (c)					

Exercise-2 : More Than One Correct Answers

1. (a, b, c, d)	2. (a, c)	3. (a, b, c)	4. (b, c, d)	5. (a, b, c)	6. (a, b, d)
7. (a, b)	8. (b, c)	9. (a, b, c)	10. (a, b, c)	11. (b, c, d)	12. (a, c, d)
13. (a, b, d)	14. (a, b, c, d)	15. (a, b, c)	16. (a, b)	17. (a, b)	18. (b, c)
19. (a, c, d)	20. (a, b, c, d)	21. (a, b, d)	22. (a, c, d)	23. (a, b, c, d)	24. (a, b, c)
25. (a, b)	26. (b, c)	27. (b, c)	28. (b, c, d)	29. (a, b, c)	30. (a, d)

31.	(c, d)	32.	(a, c)	33.	(b, c)	34.	(a, b, d)	35.	(a, b, d)	36.	(a, b, c, d)
37.	(a, b, c)	38.	(b, c)	39.	(a, b, c)	40.	(a, b, c)	41.	(a, c, d)	42.	(a, b, d)
43.	(a, b, c)	44.	(a, c, d)	45.	(a, b, c, d)	46.	(a, c, d)	47.	(a, c)	48.	(a, b, c)
49.	(a, b, d)	50.	(a, b, c)								

Exercise-3 : Linked Comprehension Type

1. (d)	2. (a)	3. (b)	4. (a)	5. (b)	6. (d)	7. (c)	8. (d)	9. (b)	10. (a)
11. (b)	12. (c)	13. (d)	14. (c)	15. (a)	16. (a)	17. (c)	18. (b)	19. (b)	20. (c)
21. (d)	22. (d)	23. (a)	24. (b)	25. (c)	26. (d)	27. (a)	28. (b)	29. (c)	30. (b)
31. (d)	32. (c)	33. (b)							

Exercise-4 : Matrix Match Type

1. (a) $\rightarrow Q$;	(b) $\rightarrow R$;	(c) $\rightarrow P, R, S$;	(d) $\rightarrow Q, R$
2. (a) $\rightarrow Q$;	(b) $\rightarrow Q, R, S$;	(c) $\rightarrow P$;	(d) $\rightarrow P, Q$
3. (a) $\rightarrow S$;	(b) $\rightarrow R$;	(c) $\rightarrow P, Q$;	(d) $\rightarrow P, Q$
4. (a) $\rightarrow P, Q$;	(b) $\rightarrow P, R, S$;	(c) $\rightarrow P, Q$;	(d) $\rightarrow P, R, S$
5. (a) $\rightarrow P, R, S$;	(b) $\rightarrow Q$;	(c) $\rightarrow R, S$;	(d) $\rightarrow Q$
6. (a) $\rightarrow Q, S$;	(b) $\rightarrow R, S$;	(c) $\rightarrow P, Q$;	(d) $\rightarrow P, Q$
7. (a) $\rightarrow Q, R$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow P$;	(d) $\rightarrow P, S$
8. (a) $\rightarrow R$;	(b) $\rightarrow P, S$;	(c) $\rightarrow P$;	(d) $\rightarrow Q, R$
9. (a) $\rightarrow Q, S$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow P, R$;	(d) $\rightarrow P, R$
10. (a) $\rightarrow P, S$;	(b) $\rightarrow P, Q, R$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow P, Q, S$
11. (a) $\rightarrow Q, S$;	(b) $\rightarrow P, R$;	(c) $\rightarrow Q, S$;	(d) $\rightarrow Q, S$
12. (a) $\rightarrow P, Q, R$;	(b) $\rightarrow P, Q, R, S$;	(c) $\rightarrow P, Q, R, S$;	(d) $\rightarrow Q$

Exercise-5 : Integer Answer Type Problems

1. (5)	2. (1)	3. (4)	4. (3)	5. (4)	6. (3)	7. (2)	8. (5)	9. (4)	10. (5)

□□□

4 Halides

EXERCISE-1 ONLY ONE CORRECT ANSWER

LEVEL-1

1. Which of the following statements are correct for nucleophile ?
   (a) All negatively charged species are nucleophiles
   (b) Nucleophiles are Lewis bases
   (c) Alkenes, alkynes, benzene and pyrrole are nucleophiles
   (d) All are correct

2. Consider the species.
   (I) $\overset{\ominus}{O}H$ (II) $CH_3-\overset{\ominus}{O}$ (III) $\overset{\ominus}{C}H_3$ (IV) $\overset{\ominus}{N}H_2$
   Arrange these nucleophilic species in their decreasing order of nucleophilicity :
   (a) III > IV > II > I (b) II > I > III > IV
   (c) I > II > III > IV (d) III > I > II > IV

3. The nucleophilicities of CH_3^-, NH_2^-, OH^- and F^- decrease in which order ?
   (a) $CH_3^- > NH_2^- > OH^- > F^-$ (b) $OH^- > NH_2^- > CH_3^- > F^-$
   (c) $NH_2^- > OH^- > CH_3^- > F^-$ (d) $CH_3^- > OH^- > F^- > NH_2^-$

4. Arrange the following nucleophiles in the order of their nucleophilic strength:
   (a) $OH^- > CH_3COO^- > OCH_3^- > C_6H_5O^-$
   (b) $CH_3COO^- < C_6H_5O^- < OCH_3^- < OH^-$
   (c) $C_6H_5O^- < CH_3COO^- < CH_3O^- < OH^-$
   (d) $CH_3COO^- < C_6H_5O^- < OH^- < CH_3O^-$

5. Correct order of leaving group tendency is :
   (a) $I^- > Br^- > Cl^- > F^-$ (b) $F^- > Cl^- > Br^- > I^-$
   (c) $Cl^- > F^- > Br^- > I^-$ (d) $I^- > Cl^- > Br^- > F^-$

6. 2-Chlorobutane $\xrightarrow{\text{15\% aq. solution of ethyl alcohol}} P$
   In this reaction 70% racemisation takes place. % of inverted product would be :
   (a) 30 (b) 70 (c) 35 (d) 65

7. In reaction $C_2H_5OH + HX \xrightarrow{ZnX_2} C_2H_5X + H_2O$ the order of reactivity of HX is :
   (a) HBr > HI > HCl (b) HI > HCl > HBr
   (c) HCl > HBr > HI (d) HI > HBr > HCl

8. Which of the following leads to the formation of an alkyl halide ?

(a) $C_2H_5OH \xrightarrow{\text{Red P+Br}_2}$ (b) $C_2H_5OH \xrightarrow{SOCl_2}$

(c) $C_2H_5OH \xrightarrow{\text{KBr+Conc. } H_2SO_4}$ (d) All of these

9. Which reaction is termed as Darzen's reaction ?

(a) $ROH + HCl$ (b) $ROH + PCl_5$ (c) $ROH + SOCl_2$ (d) $ROH + PCl_3$

10. The S_N2 reactivity order for halides is :

(a) $R—F > R—Cl > R—Br > R—I$

(b) $R—I > R—Br > R—Cl > R—F$

(c) $R—Br > R—I > R—Cl > R—F$

(d) $R—Cl > R—Br > R—F > R—I$

11. In S_N1 reaction, the first step involves the formation of :

(a) free radical (b) carbanion

(c) carbocation (d) final product

12. The rate law for the reaction, $RCl + Na(aq.) \longrightarrow ROH + NaCl$ is given by, rate $= K_1[RCl]$. The rate of the reaction will be :

(a) doubled on doubling the concentration of sodium hydroxide

(b) halved on reducing the concentration of alkyl halide to half

(c) decreased on increasing the temperature of the reaction

(d) unaffected by increasing the temperature of the reaction

13. Acetaldehyde reacts with PCl_5, to give :

(a) ethyl chloride (b) ethylene chloride

(c) ethylidene dichloride (d) trichloroacetaldehyde

14. Vinylic halides are unreactive towards nucleophilic substitution because of the following except :

(a) C-halogen bond is strong

(b) The halogen is bonded to sp^2 carbon

(c) A double bond character is developed in the carbon-halogen bond by resonance

(d) Halide ions are not good leaving groups

15. An alkyl halide may be converted into an alcohol by :

(a) addition (b) substitution

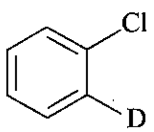
(c) dehydrohalogenation (d) elimination

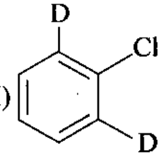
16. The given reaction is an example of $C_2H_5Br + KCN(aq.) \longrightarrow C_2H_5CN + KBr$:

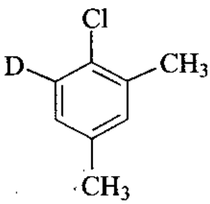
(a) elimination (b) nucleophilic substitution

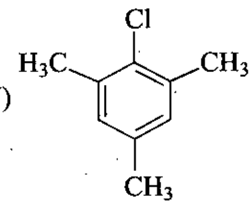
(c) electrophilic substitution (d) redox change

17. Which of the following will not undergo nucleophilic aromatic substitution ?

(I) 

(II) 

(III) 

(IV) 

(a) I, II and III (b) II and IV (c) III and IV (d) only IV

18. Arrange the following alkyl chlorides in order of decreasing reactivity in an S_N1 reaction :

(I) isopropyl bromide (II) propyl bromide
(III) *tert*-butyl bromide (IV) methyl bromide
(a) (III) > (I) > (II) > (IV) (b) (I) > (III) > (IV) > (II)
(c) (IV) > (III) > (II) > (I) (d) (I) > (II) > (III) > (IV)

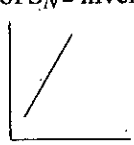
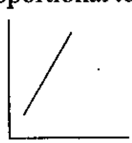
19. Which one of the following is most reactive towards nucleophilic substitution reaction ?

(a) $CH_2{=}CH{-}Cl$ (b) C_6H_5Cl
(c) $CH_3CH{=}CH{-}Cl$ (d) $ClCH_2{-}CH{=}CH_2$

20. What product would be formed from the S_N2 reaction of (R)-2-bromobutane and hydroxide ion ?

(a) 2-butanol (b) (S)-2-butanol (c) (R)-3-hexanol (d) 3-pentanol

21. Which is not correct about S_N2 ?

(a) Rate of S_N2 is directly proportional to the dielectric constant of medium.
(b) Rate of S_N2 is directly proportional to the nature of leaving group.
(c) Rate of S_N2 inversely proportional to the steric hindrance present in substrate.
(d) Rate  Rate 

(base) (substrate)

22. The reaction of 4-bromobenzyl chloride with NaCN in ethanol leads to :

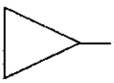
(a) 4-Bromobenzyl cyanide
(b) 4-Cyanobenzyl chloride
(c) 4-Cyanobenzyl cyanide
(d) 4-Bromo-2-cyanobenzyl chloride

23. What product would be formed from the S_N2 reaction of (S)-3-chlorohexane and hydroxide ion ?

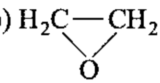
(a) 2-butanol (b) (S)-2-butanol (c) (R)-3-hexanol (d) 3-pentanol

24. In which case racemisation takes place ?

(a) $H_3C—\underset{}{\overset{C_2H_5}{\overset{|}{C}H}}—CH_2—Br \xrightarrow[S_N1]{OH^-}$ (b) $CD_3—\overset{C_2H_5}{\overset{|}{C}H}—CH_2Br \xrightarrow[S_N1]{OH^-}$

(c)  $—CH_2Br \xrightarrow[S_N1]{OH^-}$ (d) All of these

25. When ethyl iodide is heated with dry silver oxide, the product formed is :

(a) CH_3CH_2OH (b) 

(c) CH_3CHO (d) $CH_3CH_2OCH_2CH_3$

26. Alkyl halides can be converted to ethers through :

(a) Rankland reaction (b) Williamson synthesis
(c) Fittig reaction (d) Grignard reaction

27. What is the product of the reaction of ethylbromide with the nucleophiles CH_3OH ?

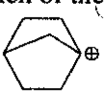
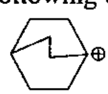
(a) $CH_3CH_2OCH_3$ (b) $CH_3CH_2NH_2$
(c) $CH_3CH_2N^+(CH_3)_2Br^-$ (d) None of these

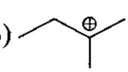
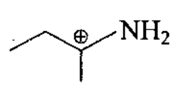
28. The order of decreasing stability of the cations is :

(I) $CH_3\overset{+}{C}HCH_3$ (II) $CH_2\overset{+}{C}HOCH_3$ (III) $CH_3\overset{+}{C}HCOCH_3$

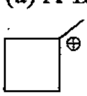
(a) III > II > I (b) I > II > III (c) II > I > III (d) I > III > II

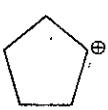
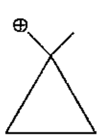
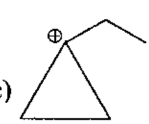
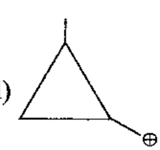
29. Which of the following two carbocation is more stable ?

(A)  (I)  (II)

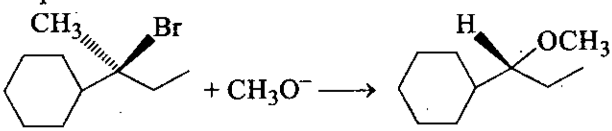
(B)  (I)  (II)

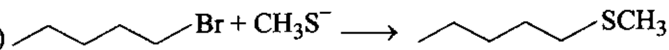
(a) A-II, B-II (b) A-I, B-I (c) A-I, B-II (d) A-II, B-I

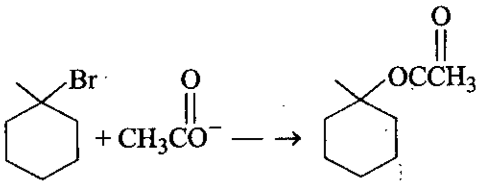
30.  rearranges to :

(a)  (b)  (c)  (d) 

31. Which of the following reactions will go faster if the concentration of the nucleophile is increased ?

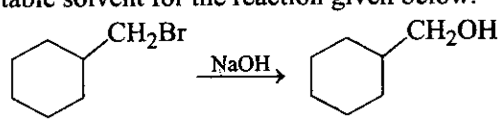
(a) 

(b) 

(c) 

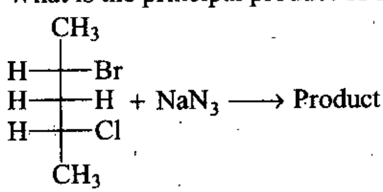
(d) No comparison between these reactions

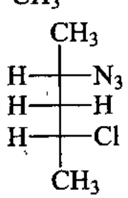
32. Suggest the suitable solvent for the reaction given below.

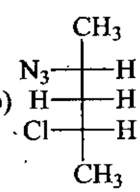


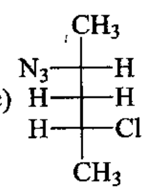
(a) H_2O (b) C_2H_5OH (c) $HCONMe_2$ (d) C_6H_6

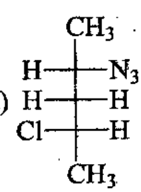
33. What is the principal product of the following reaction ?



(a) 

(b) 

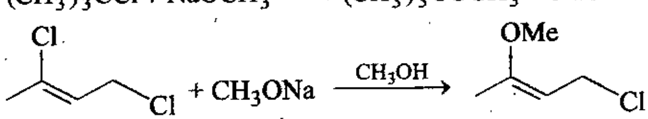
(c) 

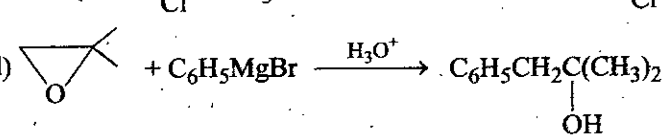
(d) 

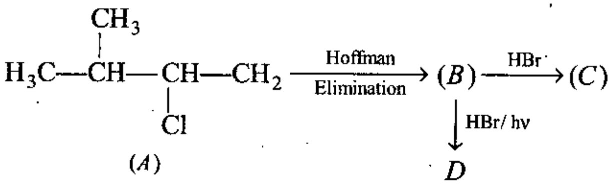
34. Which of the following reaction is possible ?

(a) $C_6H_5OH + HBr \longrightarrow C_6H_5Br + H_2O$

(b) $(CH_3)_3CCl + NaOCH_3 \longrightarrow (CH_3)_3COCH_3 + NaCl$

(c) 

(d) 

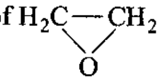
35. 

Correct order of rate of S_N2 for A, C and D will be :

(a) $A > C > D$ (b) $C > D > A$ (c) $A > D > C$ (d) $C > A > D$

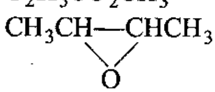
36. The order of reactivity of alkyl halide in the reaction $R-X + Mg \longrightarrow RMgX$ is :

(a) $RI > RBr > RCl$ (b) $RCl > RBr > RI$
(c) $RBr > RCl > RI$ (d) $RBr > RI > RCl$

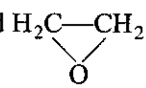
37. The reaction of  with $RMgX$, leads to the formation of :

(a) $RCHOHR$ (b) $RCHOHCH_3$ (c) R_2CHCH_2OH (d) RCH_2CH_2OH

38. Which of the following compounds on reaction with CH_3MgBr will give a tertiary alcohol ?

(a) C_6H_5CHO (b) $C_2H_5CO_2CH_3$
(c) C_2H_5COOH (d) 

39. $RMgBr + A \xrightarrow{H_3O^{\oplus}} CH_3CH_2CH_2OH$, R and A are :

(a) CH_3CH_2- and HCHO (b) CH_3- and 

(c) both are correct (d) none is correct

40. $CH_3MgBr + CH_2{=}CH-\overset{\overset{\displaystyle O}{\|}}{C}-H \xrightarrow{H_3O^+}$ Product (1, 4 addition). It is :

(a) $CH_2{=}CH-\overset{\overset{\displaystyle OH}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}-H$ (b) $\underset{\underset{\displaystyle OH}{|}}{CH_2}\,CH{=}CH-CH_3$

(c) $CH_3CH_2CH_2CHO$ (d) none is correct

41. The product obtained on treating acetone with ethyl magnesium bromide followed by hydrolysis is :

(a) $CH_3CH_2CH_2CH_2OH$

(b) $H_3C-\underset{H}{\overset{OH}{\underset{|}{\overset{|}{C}}}}-\underset{H_2}{\underset{|}{C}}-CH_3$

(c) $H_3C-\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-OH$

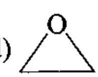
(d) $H_3C-\underset{CH_3}{\overset{CH_2CH_3}{\underset{|}{\overset{|}{C}}}}-OH$

42. Consider the following reaction,

$$CH_3CH_2OH + CH_3CH_2MgBr \longrightarrow CH_3CH_2H^* + Mg\begin{matrix} \diagup OCH_2CH_3 \\ \diagdown Br \end{matrix}$$ which of the following statements is (are) correct ?

(a) $CH_3CH_2OH + CH_3CH_2H^*$ comes from the Grignard reagent.
(b) H^* in $CH_3CH_2H^*$ comes from the Grignard reagent.
(c) H^* in $CH_3CH_2H^*$ comes from ethanol.
(d) H^* in $CH_3CH_2H^*$ comes from the alkyl group of alcohol.

43. 2-Phenylethanol may be prepared by the reaction of phenyl magnesium bromide with :

(a) HCHO (b) CH_3CHO (c) CH_3COCH_3 (d) 

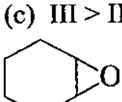
44. Order of rate of reaction of following compound with phenyl magnesium bromide is :

$$\underset{\text{I}}{Me-\overset{O}{\overset{\|}{C}}-Cl},\quad \underset{\text{II}}{Me-\overset{O}{\overset{\|}{C}}-H},\quad \underset{\text{III}}{Me-\overset{O}{\overset{\|}{C}}-O-Et}$$

(a) I > II > III (b) II > III > I (c) III > I > II (d) II > I > III

45. Select the correct order of decreasing reactivity of the following compounds towards the attack of Grignard reagent.

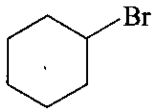
(I) Methyl benzoate (II) Benzaldehyde
(III) Benzoylchloride (IV) Acetophenone
(a) II > III > I > IV (b) I > II > III > IV
(c) III > II > IV > I (d) II > IV > I > III

46.  $\xrightarrow[NH_4Cl]{CH_3MgX}$ Product

What is the product ?
(a) Enantiomer (b) Diastereoisomer (c) Meso (d) Achiral

47. $RMgX \xrightarrow[\text{(ii) } NH_4Cl]{\text{(i) } CH_3CN} (A) \xrightarrow[NH_4Cl]{RMgX} (B)$, (B) will be :

(a) 1° ROH (b) 2°ROH (c) 3° ROH (d) Alkene

48. 

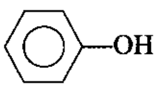
$\xrightarrow{Mg} (A) \xrightarrow[\text{(ii) } H^+/H_2O]{\text{(i) } ^{14}CO_2} (B) \xrightarrow{NaHCO_3} (C)$ gas, product C is :

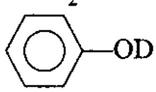
(a) CO (b) $^{14}CO_2$
(c) CO_2 (d) A mixture $^{14}CO_2$ and CO_2

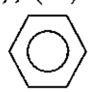
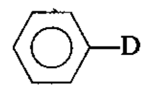
LEVEL-2

1. In the given reaction

$$PhMgBr + D_2O \longrightarrow (X);\ (X) \text{ will be :}$$

(a) 

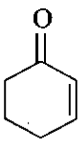
(b) 

(c) 
(d) 

2. Find the product of the following reaction

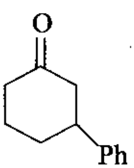
$$CH_3CH_2MgBr + HgCl_2 \longrightarrow (X); (X) \text{ will be :}$$

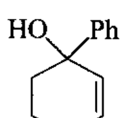
(a) $(CH_3CH_2)_2Hg$ (b) CH_3CH_3 (c) CH_3CH_2Cl (d) CH_3CH_2HgCl

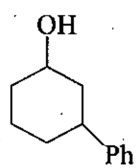
3. 

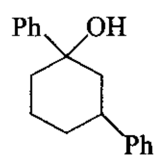
$\xrightarrow[H_3\overset{\oplus}{O}]{PhMgBr}$ Product

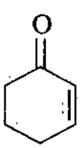
Identify the structure of product :

(a) 

(b) 

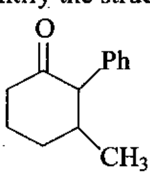
(c) 

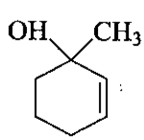
(d) 

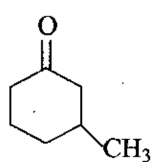
4. 

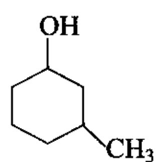
$\xrightarrow[H^{\oplus}/H_2O]{(CH_3)_2CuLi}$ Product

Identify the structure of product :

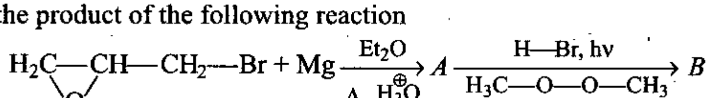
(a) 

(b) 

(c) 

(d) 

5. Find the product of the following reaction



Find out '*B*' :

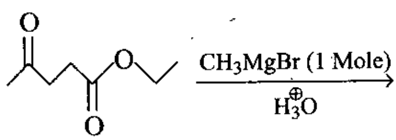
(a) $HO-H_2C-CH_2-CH_2-Br$ (b) $HO-CH_2-\underset{}{\overset{Br}{\overset{|}{C}}}H-CH_3$

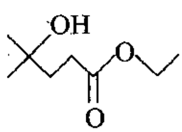
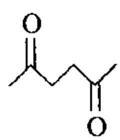
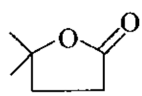
(c) $HO-H_2C-CH=CH_2$ (d) $Br\overset{\oplus}{Mg}\overset{\ominus}{C}H_2-CH=CH_2$

6. $H-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-H \xrightarrow[H_3^{\oplus}O]{CH_3MgBr\ (excess)}$ Product :

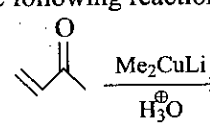
(a) $H_3C-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-H$ (b) $H_3C-\underset{OH}{\underset{|}{C}}H-\underset{OH}{\underset{|}{C}}H-CH_3$

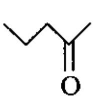
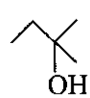
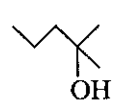
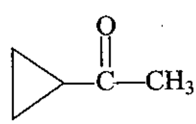
(c) $H_3C-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-CH_3$ (d) $\underset{COOH}{\underset{|}{CH_2OH}}$

7.  Product :

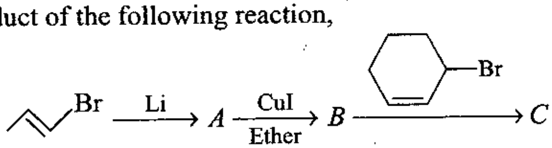
(a)  (b)  (c)  (d) 

8. Find the product of the following reaction,

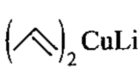
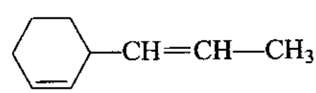
 Product :

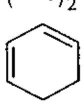
(a)  (b)  (c)  (d) 

9. Find the product of the following reaction,

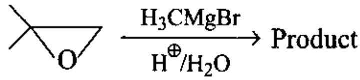


Find out the final product (*C*) :

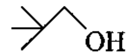
(a)    (b) 

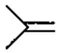
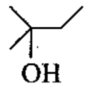
(c)    (d) None of these

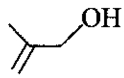
10. In the given reaction

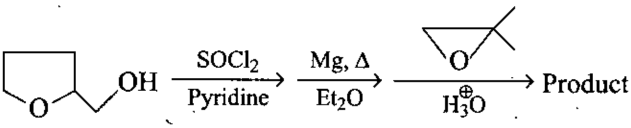


Find the product of reaction :

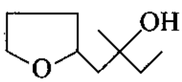
(a) 

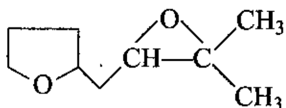
(b) 
(c) 

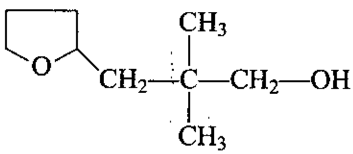
(d) 

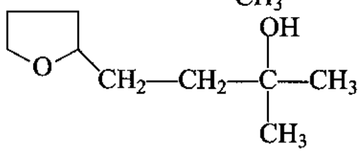
11. 

Product of reaction is :

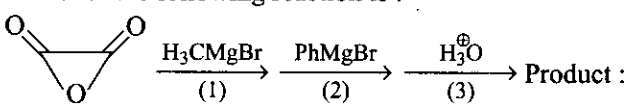
(a) 

(b) 

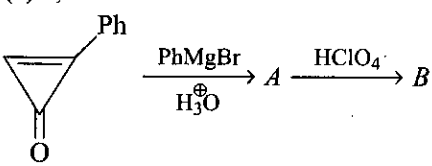
(c) 

(d) 

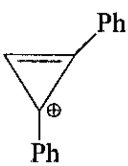
12. The end product of the following reaction is :

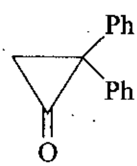


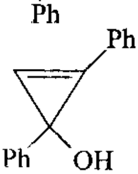
(a) α, β-diketone (b) α-hydroxy acid
(c) 1, 2-diol (d) β-hydroxy acid

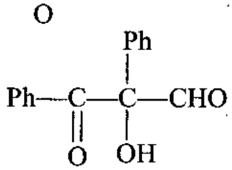
13. 

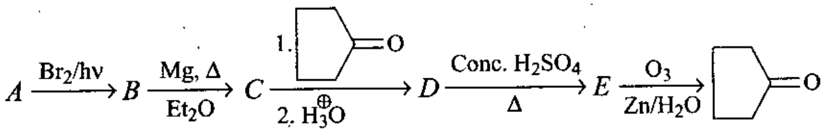
Find out the final product '*B*' :

(a) 

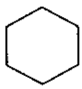
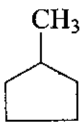
(b) 

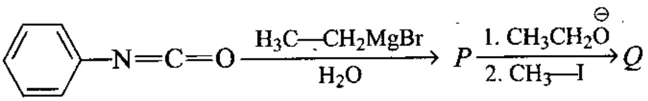
(c) 

(d) 

14. 

Find out the structure of 'A':

(a)  (b)  (c)  (d) 

15. 

Find out P and Q:

(a) P is $Ph-N=C(OH)-CH_2CH_3$ and Q is $Ph-N=C(O-CH_3)-CH_2CH_3$

(b) P is $Ph-NH-\overset{O}{\overset{\|}{C}}-CH_2CH_3$ and Q is $Ph-N(CH_3)-\overset{O}{\overset{\|}{C}}-CH_2CH_3$

(c) P is $Ph-NH-\overset{O}{\overset{\|}{C}}-CH_2CH_3$ and Q is $Ph-N=C(OCH_3)-CH_2CH_3$

(d) P and Q both are same

16. $Ph-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-Ph \xrightarrow[H_3\overset{\oplus}{O}]{H_3CMgBr}$

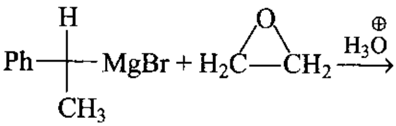
How many products will be obtained and how many can be separated by fractional distillation method?

(a) 3, 3 (b) 2, 3 (c) 3, 2 (d) 2, 2

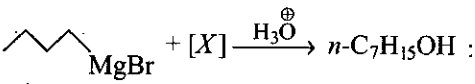
17. Which of the following reactions will give 2° chiral alcohol as major product?

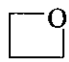
(a) $Ph-\underset{CH_3}{\overset{H}{C}}-MgI \xrightarrow{O_2} \xrightarrow{H_3\overset{\oplus}{O}}$

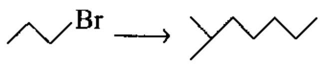
(b) $\underset{\text{(excess)}}{CH_3MgI} + H-\overset{O}{\overset{\|}{C}}-O-CH_2CH_3 \xrightarrow{H_3\overset{\oplus}{O}}$

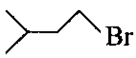
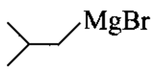
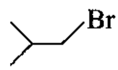
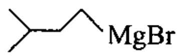
(c) 

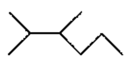
(d) $PhMgBr + CH_3—\overset{O}{\overset{||}{C}}—Ph \xrightarrow{H_3\overset{\oplus}{O}}$

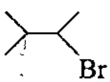
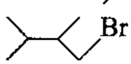
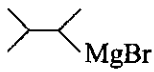
18. 

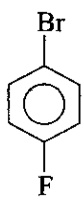
(a)  (b)  (c)  (d) 

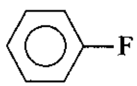
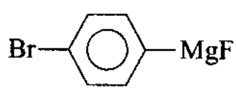
19. 

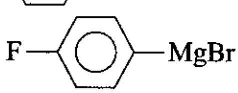
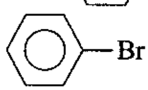
(a)  (b)  (c)  (d) 

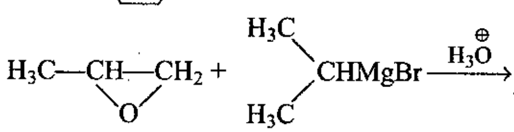
20. $(H_3C—CH_2)_2CuLi + (X) \longrightarrow$ 

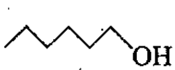
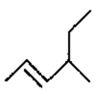
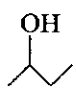
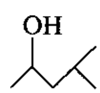
(a)  (b)  (c)  (d) 

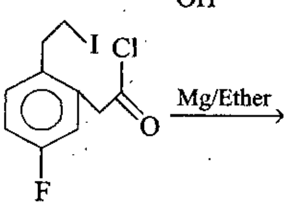
21.  $+ Mg \xrightarrow{Ether}$

(a)  (b) 

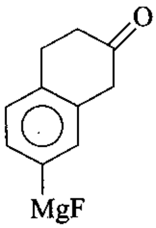
(c)  (d) 

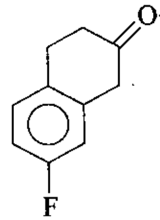
22. 

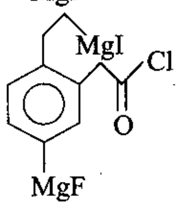
(a)  (b)  (c)  (d) 

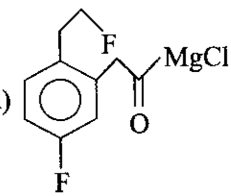
23. 

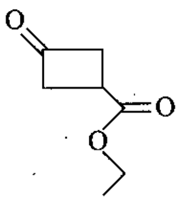
The final product of the reaction is :

(a) 

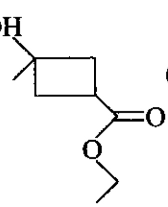
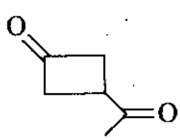
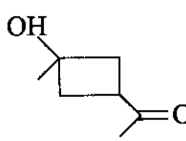
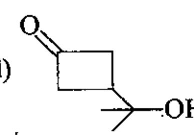
(b) 

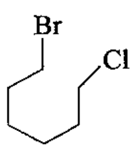
(c) 

(d) 

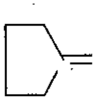
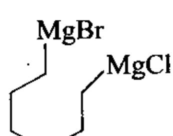
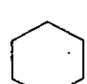
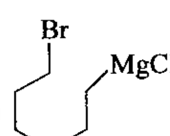
24.  $\xrightarrow[H_3\overset{\oplus}{O}]{H_3CMgBr\ (1\ Mole)}$ Product

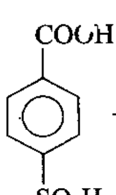
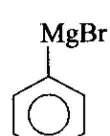
Find the structure of product :

(a)  (b)  (c)  (d) 

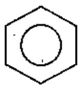
25.  $\xrightarrow[\Delta]{Mg/THF}$ (P)

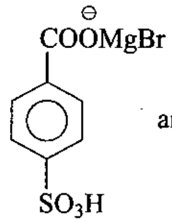
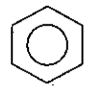
Identify (P) :

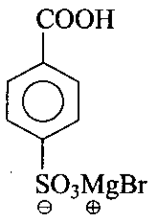
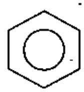
(a)  (b)  (c)  (d) 

26.  +  $\longrightarrow X + Y$

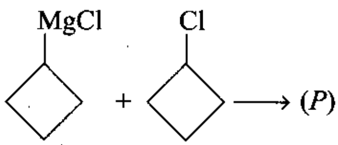
X and Y are respectively :

(a)  only

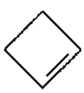
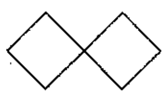
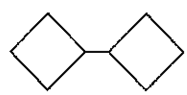
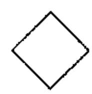
(b)  and 

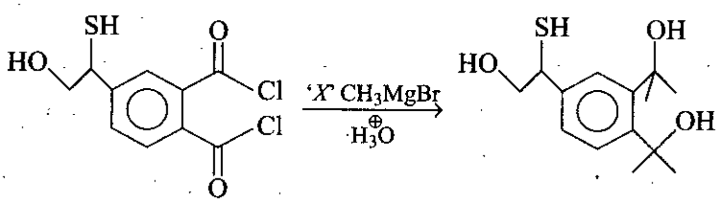
(c)  and 

(d) None of these

27. 

Compound (P) is :

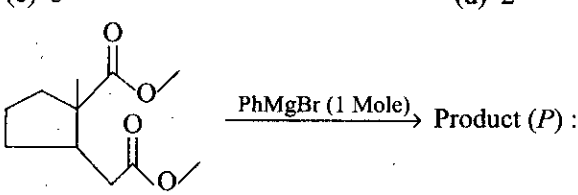
(a)  (b)  (c)  (d) 

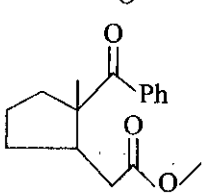
28. 

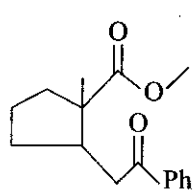
Find out the value of 'X' :

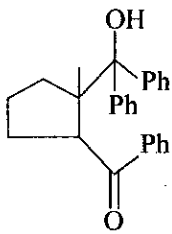
(a) 6 (b) 4

(c) 3 (d) 2

29. 

(a) 

(b) 

(c) 

(d) None of these

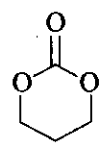
30. $Cl-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[H_3\overset{\oplus}{O}]{PhMgBr\ (excess)} (X)$; Product (X) is :

(a) $Ph-\overset{O}{\overset{\|}{C}}-Cl$

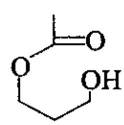
(b) $Ph-\overset{O}{\overset{\|}{C}}-Ph$

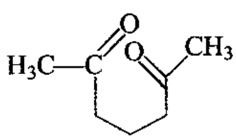
(c) $Ph-\underset{Ph}{\underset{|}{\overset{OH}{\overset{|}{C}}}}-Ph$

(d) $Ph-\overset{O}{\overset{\|}{C}}-O-Ph$

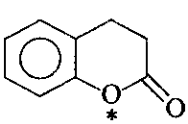
31. $\underset{(excess)}{H_3C-MgBr}$ +  $\xrightarrow{H_3\overset{\oplus}{O}} (X)$; Product (X) is :

(a) $H_3C-\overset{O}{\overset{\|}{C}}-CH_3$

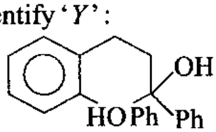
(b) 

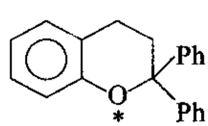
(c) 

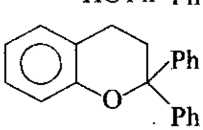
(d) $H_3C-\underset{CH_3}{\underset{|}{\overset{OH}{\overset{|}{C}}}}-CH_3$

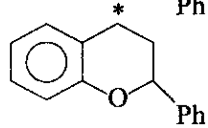
32.  $\xrightarrow[H_3\overset{\oplus}{O}]{PhMgBr} X \xrightarrow[\Delta]{Conc.\ H_2SO_4} Y$

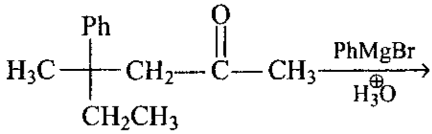
Identify 'Y' :

(a) 

(b) 

(c) 

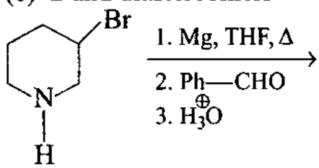
(d) 

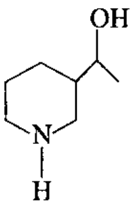
33. 

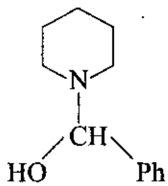
How many products will be obtained and what is the relationship between them?

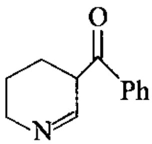
(a) 2 and enantiomers (b) 3 and all are diastereomers

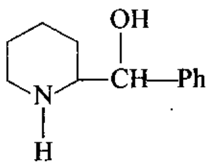
(c) 2 and diastereomers (d) 3 and all are homomers

34.  Major Product :

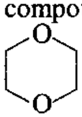
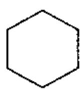
(a) 

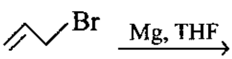
(b) 

(c) 

(d) 

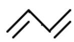
35. Which of the following compounds is not suitable solvent for Grignard reagent?

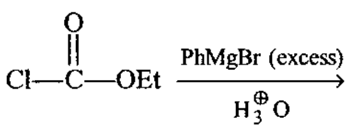
(a)  (b)  (c)  (d) 

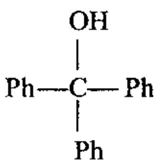
36. 

(2 Mole)

Find the major product :

(a)  (b)  (c)  (d) 

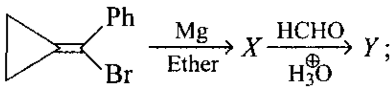
37.  Product :

(a) 

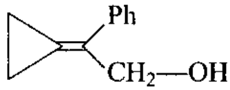
(b) $Ph-\overset{\overset{O}{\|}}{C}-Cl$

(c) $Ph-\overset{\overset{O}{\|}}{C}-OEt$

(d) $Ph-\overset{\overset{O}{\|}}{C}-Ph$

38. 

Product '*Y*' is :

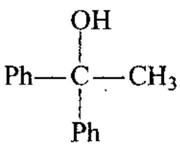
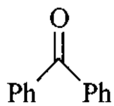
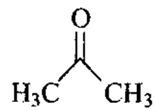
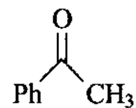
(a) 

(b) 

(c) 

(d) None of these

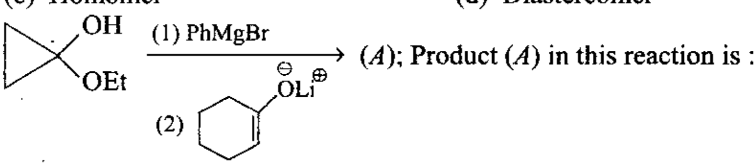
39. $PhMgBr + H_3C—C≡N \xrightarrow{H_3\overset{\oplus}{O}}$ Product :

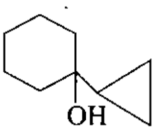
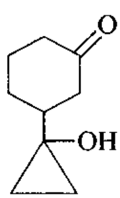
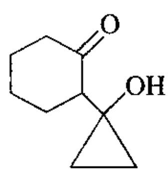
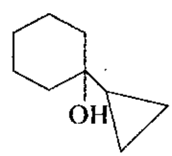
(a) 
(b) 
(c) 
(d) 

40. $H_3C—CH_2—\overset{O}{\overset{\|}{C}}—H \xrightarrow[H_3\overset{\oplus}{O}]{PhMgBr}$ Products

Products obtained in the reaction are :

(a) Meso
(b) Racemic
(c) Homomer
(d) Diastereomer

41. 

(a) 
(b) 
(c) 
(d) 

42. Which alkyl halide will react fastest with aqueous methanol?

(a) $Me_3C—Br$
(b) $Me_3C—Cl$
(c) $Me_2CH—Br$
(d) $CH_3—CH_2—CH_2—Br$

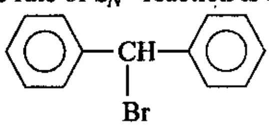
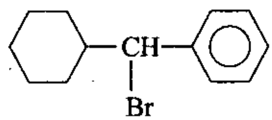
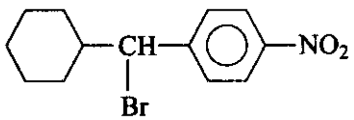
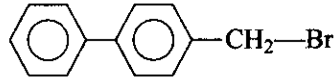
43. $H_3C—\overset{\ominus}{S}Na^{\oplus} + CH_3CH_2—X \longrightarrow$

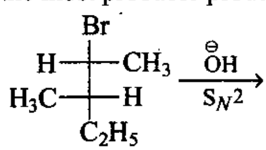
The reaction is fastest when X is :

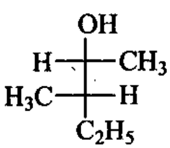
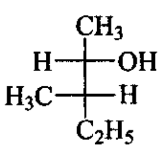
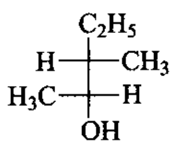
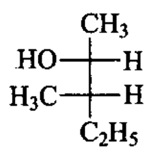
(a) —OH
(b) —F
(c) $—O—\overset{O}{\overset{\|}{C}}—CF_3$
(d) $—O—\overset{O}{\overset{\|}{C}}—CH_3$

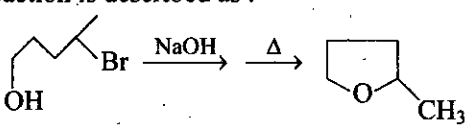
44. When the concentration of alkyl halide is triple and concentration of $\overset{\ominus}{O}H$ is reduced to half, the rate of S_N2 reaction increased by :
(a) 3 times (b) 1.5 times (c) 2 times (d) 6 times

45. The compound which undergoes fastest reaction with aq. NaOH solution is :
(a) $C_6H_5-\underset{\large Cl}{\underset{|}{C}H}-OCH_3$ (b) $C_6H_5-\underset{\large Cl}{\underset{|}{C}H}-CH_3$
(c) $C_6H_5-CH_2-CH_2-Cl$ (d) $C_6H_5-\underset{\large Cl}{\underset{|}{C}H}-CH_2CH_3$

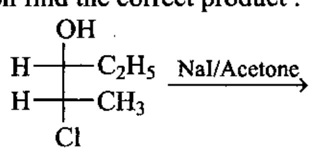
46. The rate of S_N1 reaction is fastest with :
(a)  (b) 
(c)  (d) 

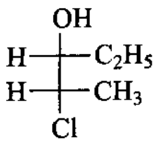
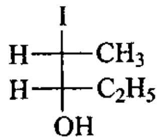
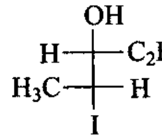
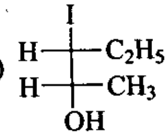
47. In the following reaction the most probable product will be :


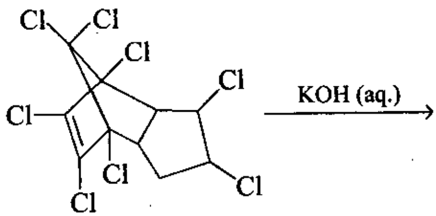
(a)  (b)  (c)  (d) 

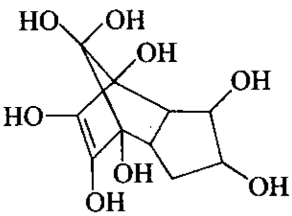
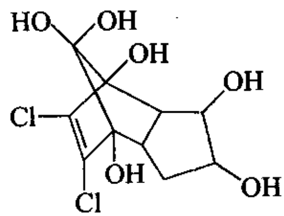
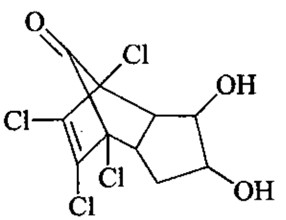
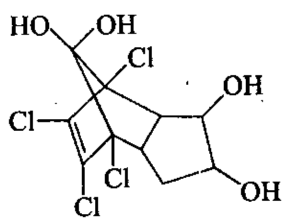
48. The following reaction is described as :


(a) S_N1 reaction with racemisation
(b) Intramolecular S_N2 reaction with walden inversion
(c) Intramolecular S_N2 reaction with retention of configuration
(d) Intramolecular S_N2 reaction with racemisation

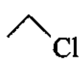
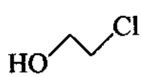
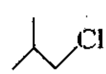
49. In the following reaction find the correct product :


(a)  (b)  (c)  (d) 

50. 

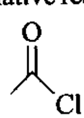
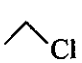
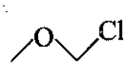
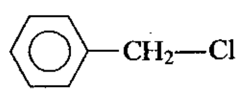
(a) 
(b) 
(c) 
(d) 

51. The correct decreasing order of relative reactivity of the following chlorides toward aqueous KOH solution :

 (*P*)  (*Q*)  (*R*)  (*S*)

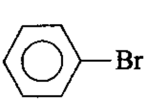
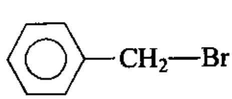
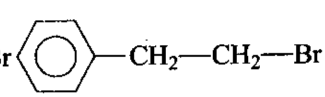
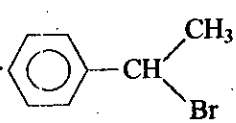
(a) $P > Q > R > S$ (b) $R > P > Q > S$ (c) $S > R > Q > P$ (d) $R > S > Q > P$

52. The relative reactivity of following halides toward S_N2 reaction follows the order :

 (*P*)  (*Q*)  (*R*)  (*S*)

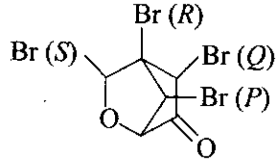
(a) $Q > S > R > P$ (b) $P > S > R > Q$ (c) $S > R > Q > P$ (d) $P > R > S > Q$

53. Rate of S_N1 reaction is :

 (*P*)  (*Q*)  (*R*)  (*S*)

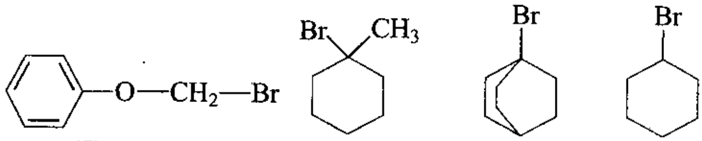
(a) $S > Q > R > P$ (b) $S > R > P > Q$ (c) $P > Q > R > S$ (d) $S > R > Q > P$

54. In the following compound, arrange the reactivity of different bromine atoms toward NaSH in decreasing order :



(a) $P > Q > R > S$ (b) $S > Q > P > R$ (c) $Q > S > P > R$ (d) $P > S > Q > R$

55. Rate of reaction with aqueous ethanol follows the order :



(P) (Q) (R) (S)

(a) $P > Q > S > R$ (b) $Q > P > R > S$ (c) $P > R > Q > S$ (d) $R > P > S > Q$

56. The reactivity of PhMgBr with the following compounds is :

PhOH (P) CH_3CHO (Q) $R—C \equiv CH$ (R) $H_3C—\underset{\underset{O}{\|}}{C}—Cl$ (S)

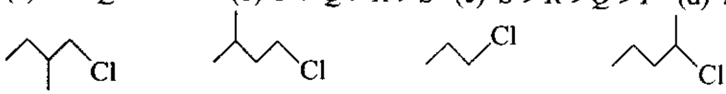
(a) $P > Q > R > S$ (b) $S > R > Q > P$ (c) $P > R > S > Q$ (d) $R > P > Q > S$

⇒ **Arrange the following in decreasing order of S_N2 reaction (From question no. 57-65).**

57. CH_3Cl (P) CH_3CH_2Cl (Q) $CH_3CH_2CH_2Cl$ (R) $CH_3—\underset{\overset{|}{Cl}}{CH}—CH_3$ (S)

(a) $P > Q > S > R$ (b) $P > Q > R > S$ (c) $S > R > Q > P$ (d) $S > Q > R > P$

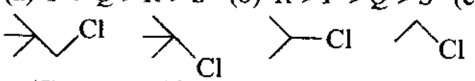
58.



(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $R > P > Q > S$ (c) $Q > R > P > S$ (d) $R > Q > P > S$

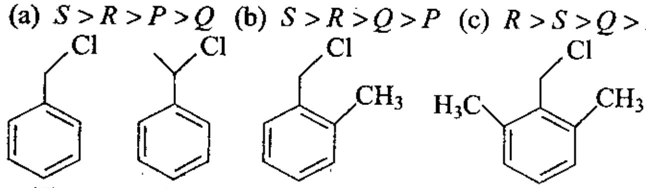
59.



(P) (Q) (R) (S)

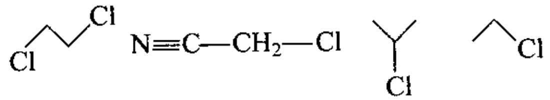
(a) $S > R > P > Q$ (b) $S > R > Q > P$ (c) $R > S > Q > P$ (d) $S > P > R > Q$

60.



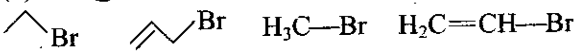
(P) (Q) (R) (S)

(a) $P > R > S > Q$ (b) $P > Q > R > S$ (c) $P > R > Q > S$ (d) $R > Q > S > P$

61. 

(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > P > S > R$ (c) $Q > P > R > S$ (d) $R > S > Q > P$

62. 

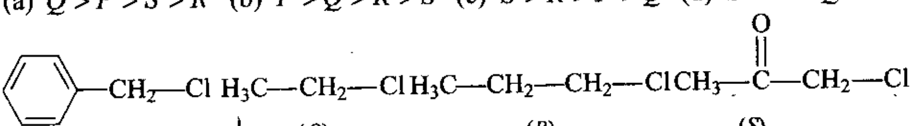
(P) (Q) (R) (S)

(a) $S > P > Q > R$ (b) $Q > S > R > P$ (c) $Q > R > P > S$ (d) $R > Q > P > S$

63. $H_3C—O—CH_2—Cl$ $\quad H_3C—\overset{\overset{\Large O}{\|}}{C}—CH_2—Cl$ $\quad H_3C—CH_2—Cl$ $\quad H_3C—Cl$

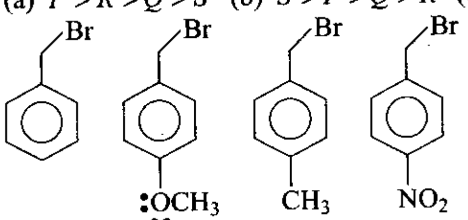
(P) (Q) (R) (S)

(a) $Q > P > S > R$ (b) $P > Q > R > S$ (c) $S > R > P > Q$ (d) $S > R > Q > P$

64. 

(P) (Q) (R) (S)

(a) $P > R > Q > S$ (b) $S > P > Q > R$ (c) $Q > R > P > S$ (d) $Q > S > P > R$

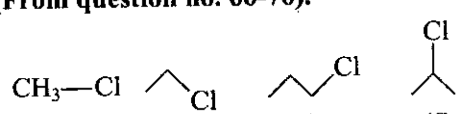
65. 

(P) (Q) (R) (S)

(a) $Q > R > P > S$ (b) $R > Q > S > P$ (c) $P > Q > R > S$ (d) $S > P > R > Q$

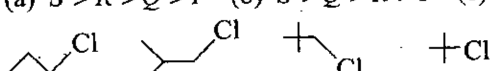
⇒ **Arrange the following in decreasing order of reactivity toward S_N1 reaction.**

(From question no. 66-76).

66. 

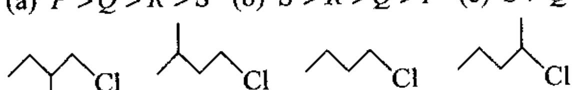
(P) (Q) (R) (S)

(a) $S > R > Q > P$ (b) $S > Q > R > P$ (c) $R > S > Q > P$ (d) $P > Q > R > S$

67. 

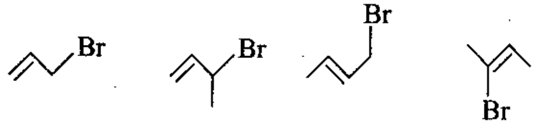
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $S > R > Q > P$ (c) $S > Q > R > P$ (d) $R > Q > S > P$

68. 

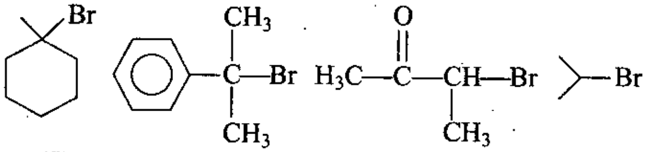
(P) (Q) (R) (S)

(a) $S > Q > P > R$ (b) $S > P > Q > R$ (c) $Q > P > S > R$ (d) $S > R > Q > P$

69. 

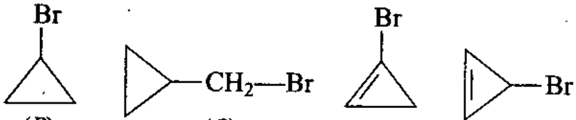
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $Q > R > S > P$ (c) $Q > P > R > S$ (d) $Q > R > P > S$

70. 

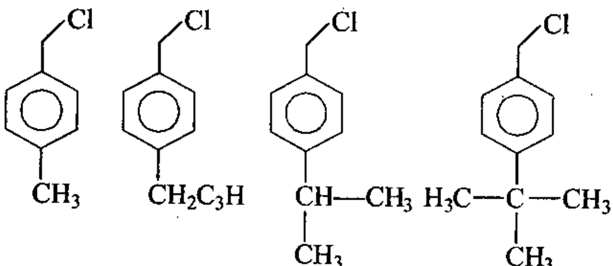
(P) (Q) (R) (S)

(a) $P > Q > S > R$ (b) $Q > P > S > R$ (c) $Q > P > R > S$ (d) $R > S > P > Q$

71. 

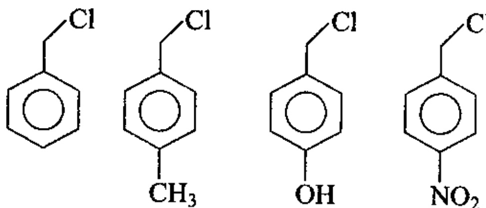
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $S > R > P > Q$ (c) $Q > S > P > R$ (d) $Q > S > R > P$

72. 

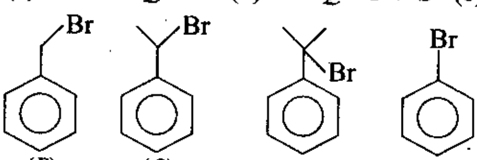
(P) (Q) (R) (S)

(a) $S > R > Q > P$ (b) $R > S > Q > P$ (c) $Q > R > S > P$ (d) $P > Q > R > S$

73. 

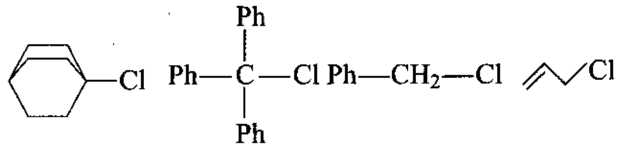
(P) (Q) (R) (S)

(a) $S > P > Q > R$ (b) $R > Q > P > S$ (c) $Q > R > P > S$ (d) $S > Q > P > R$

74. 

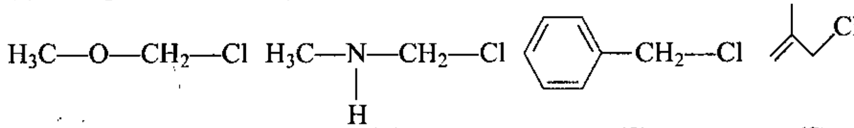
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $S > P > Q > R$ (c) $R > Q > P > S$ (d) $R > P > Q > S$

75. 

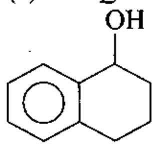
(P) (Q) (R) (S)

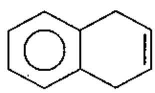
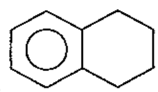
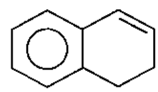
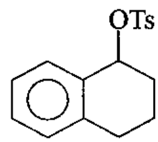
(a) $P > Q > R > S$ (b) $Q > R > S > P$ (c) $P > R > Q > S$ (d) $R > S > Q > P$

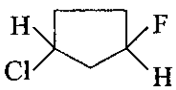
76. 

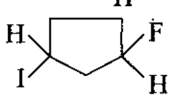
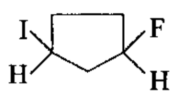
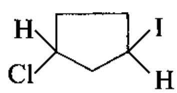
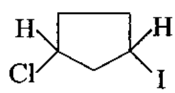
(P) (Q) (R) (S)

(a) $P > Q > R > S$ (b) $R > Q > P > S$ (c) $Q > P > R > S$ (d) $Q > P > S > R$

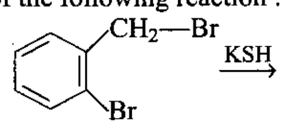
77.  $\xrightarrow{TsCl} X \xrightarrow{LiAlH_4} Y$; Identify major product 'Y' :

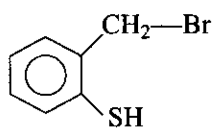
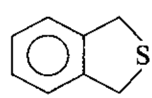
(a)  (b)  (c)  (d) 

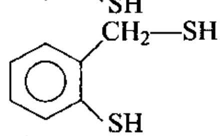
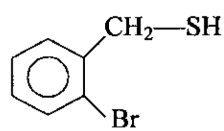
78.  + NaI (1 mole) $\xrightarrow{\text{Acetone}}$ Major product :

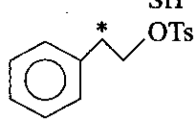
(a)  (b)  (c)  (d) 

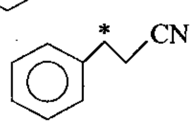
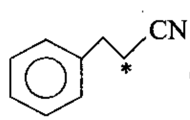
79. Find the major product of the following reaction :

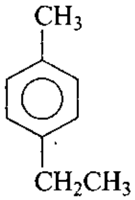


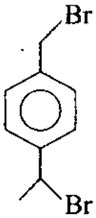
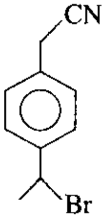
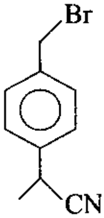
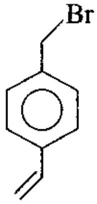
(a)  (b) 

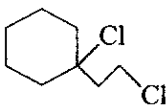
(c)  (d) 

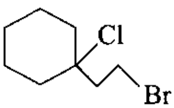
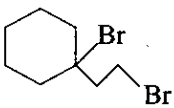
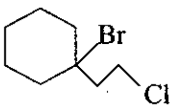
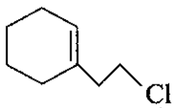
80.  $\xrightarrow{NaCN}$ Product :

(a)  (b)  (c) Both (a) and (b) (d) None of these

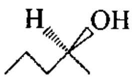
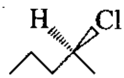
81.  $\xrightarrow[\text{(2 Mole)}]{\text{NBS}} A \xrightarrow[\text{(1 Mole)}]{\text{KCN}} B$; Product B is :

(a) 
(b) 
(c) 
(d) 

82.  $\xrightarrow{\text{NaBr/DMSO}}$

(a) 
(b) 
(c) 
(d) 

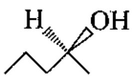
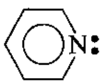
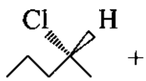
83. The reaction

 $+ SOCl_2 \longrightarrow$  $+ SO_2 + HCl$

proceed by the mechanism :

(a) S_N1 (b) S_N2 (c) S_E2 (d) S_Ni

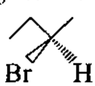
84. The reaction

 $+ SOCl_2$  $\longrightarrow$  $+ SO_2 + HCl$

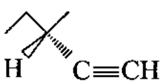
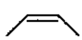
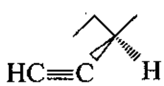
proceed by the mechanism :

(a) S_N1 (b) S_N2 (c) S_E (d) S_Ni

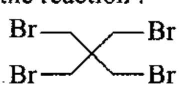
85. Consider the following reaction

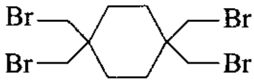
 $+ HC{\equiv}\overset{\ominus}{C}Na^{\oplus} \xrightarrow{Et_2O}$

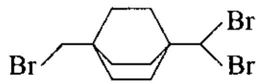
Which of the following products is not expected to form?

(a) 
(b) 
(c) 
(d) 

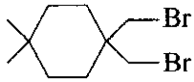
86. The product formed in the reaction :

 $\xrightarrow[\text{ether, }\Delta]{\text{Na}}$

(a) 

(b) 

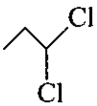
(c) 

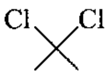
(d) 

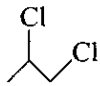
87. Consider the following sequence of reactions

$$\underset{C_3H_6Cl_2}{A} \xrightarrow[\Delta]{\text{alc. KOH}} B \xrightarrow[H_2O_2/\overset{\ominus}{O}H]{B_2H_6} C;\ A \xrightarrow[\Delta]{\text{aq. KOH}} C.$$

The compound A is :

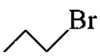
(a) 

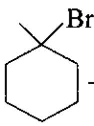
(b) 

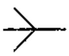
(c) 

(d) 

88. Which of the following reactions will go faster if concentration of nucleophile is increased?

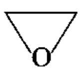
(a)  $+ KCN \xrightarrow{EtOH}$

(b)  $+ CH_3CO\overset{\ominus}{O}\overset{\oplus}{Na} \xrightarrow{CH_3COOH}$

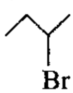
(c)  $Br + H_2O \longrightarrow$

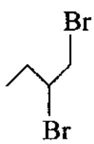
(d) $Ph_2CH\text{—}Br + H_2O \longrightarrow$

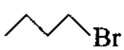
89. Consider the following sequence of reaction

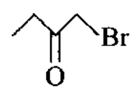
 $\xrightarrow[H_3\overset{\oplus}{O}]{CH_3CH_2MgBr} A \xrightarrow{PBr_3} B$

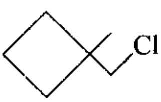
The product B is :

(a) 

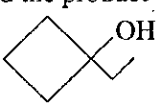
(b) 

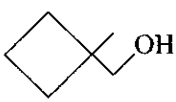
(c) 

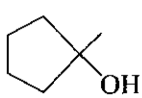
(d) 

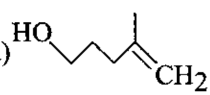
90.  $\xrightarrow[H_2O]{AgNO_3}$ Product

Find the product :

(a) 

(b) 

(c) 

(d) 

91. The order of decreasing nucleophilicities of the following species is :

(a) $CH_3\overset{\ominus}{S} > CH_3\overset{\ominus}{O} > CH_3CO\overset{\ominus}{O} > CH_3OH$

(b) $CH_3CO\overset{\ominus}{O} > CH_3\overset{\ominus}{S} > CH_3\overset{\ominus}{O} > CH_3OH$

(c) $CH_3OH > CH_3\overset{\ominus}{S} > CH_3CO\overset{\ominus}{O} > CH_3\overset{\ominus}{O}$

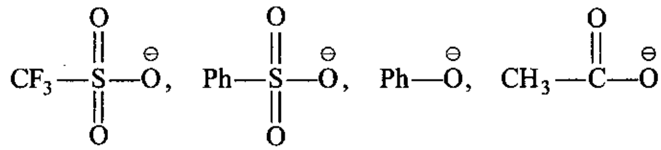
(d) $CH_3\overset{\ominus}{O} > CH_3OH > CH_3CO\overset{\ominus}{O} > CH_3\overset{\ominus}{S}$

92. The order of decreasing nucleophilicity of the following is :

(a) $H_2O > \overset{\ominus}{O}H > CH_3CO\overset{\ominus}{O} > CH_3\overset{\ominus}{O}$ (b) $CH_3\overset{\ominus}{O} > \overset{\ominus}{O}H > CH_3CO\overset{\ominus}{O} > H_2O$

(c) $CH_3CO\overset{\ominus}{O} > CH_3\overset{\ominus}{O} > \overset{\ominus}{O}H > H_2O$ (d) $\overset{\ominus}{O}H > CH_3\overset{\ominus}{O} > CH_3CO\overset{\ominus}{O} > H_2O$

93. Consider the following nucleophiles



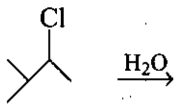
I II III IV

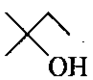
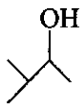
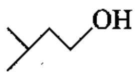
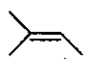
when attached to sp^3-hybridized carbon, their leaving group ability in nucleophilic substitution reactions decreases in the order :

(a) I > II > III > IV (b) I > II > IV > III

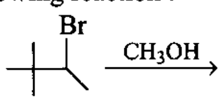
(c) IV > I > II > III (d) IV > III > II > I

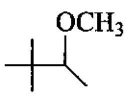
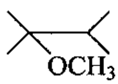
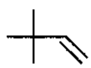
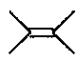
94. Find the product of the following reaction :



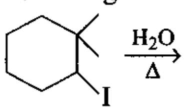
(a)  (b)  (c)  (d) 

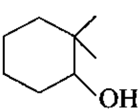
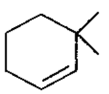
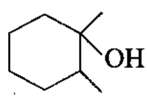
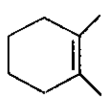
95. Find the product of the following reaction :



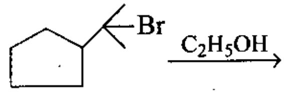
(a)  (b)  (c)  (d) 

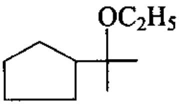
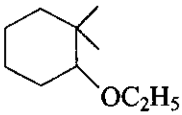
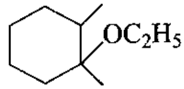
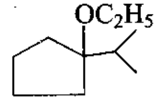
96. Find the major product of the following reaction :



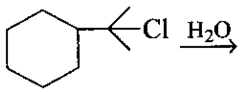
(a)  (b)  (c)  (d) 

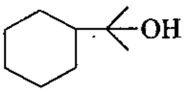
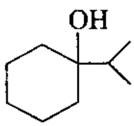
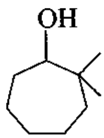
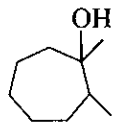
97. Find the major product of the following reaction :



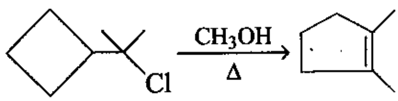
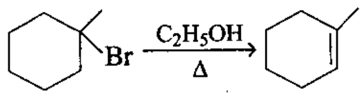
(a)  (b)  (c)  (d) 

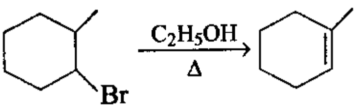
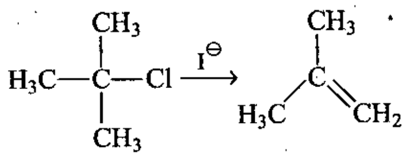
98. Find the major product of the following reaction :



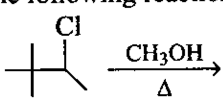
(a)  (b)  (c)  (d) 

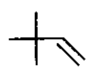
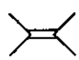
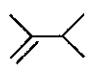
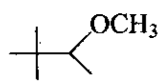
99. Which of the following reactions is not feasible?

(a)  (b) 

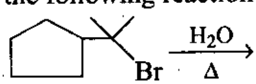
(c)  (d) 

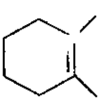
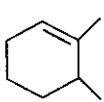
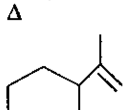
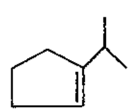
100. Find the major product of the following reaction :



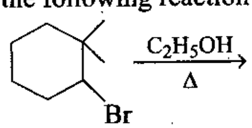
(a)  (b)  (c)  (d) 

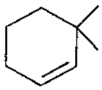
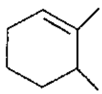
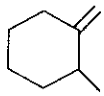
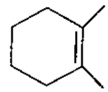
101. Find the major product of the following reaction :



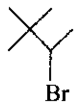
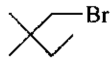
(a)  (b)  (c)  (d) 

102. Find the major product of the following reaction :

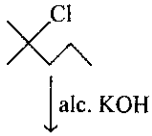
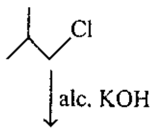
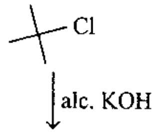
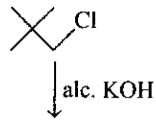


(a)  (b)  (c)  (d) 

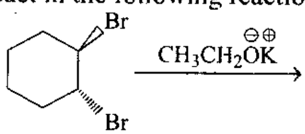
103. Which of the following cannot undergo E_2 reaction?

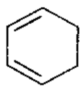
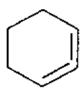
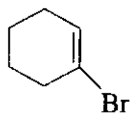
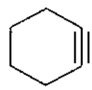
(a)  (b)  (c)  (d) None of these

104. In which of the following reactions, regioselectivity can be observed?

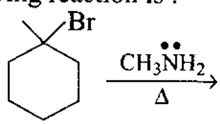
(a)  (b)  (c)  (d) 

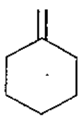
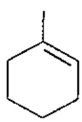
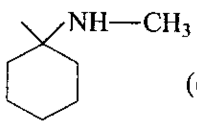
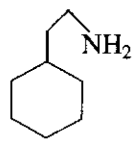
105. The most probable product in the following reaction is :



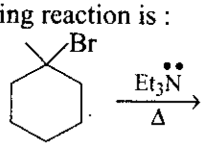
(a)  (b)  (c)  (d) 

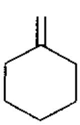
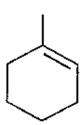
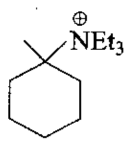
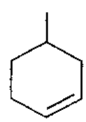
106. Major product of the following reaction is :

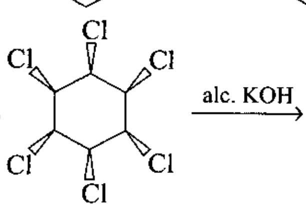


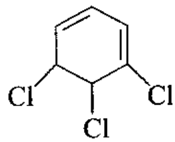
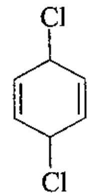
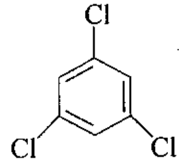
(a)  (b)  (c)  (d) 

107. Major product of the following reaction is :

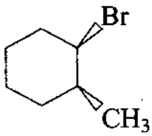
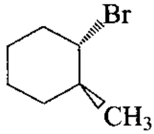
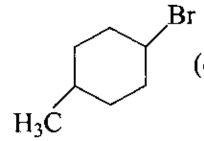
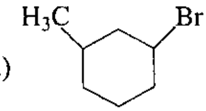


(a)  (b)  (c)  (d) 

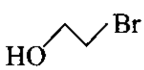
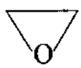
108. 

(a)  (b)  (c)  (d) No reaction

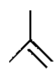
109. Which of the following will undergo fastest elimination with alcoholic KOH?

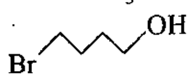
(a)  (b)  (c)  (d) 

110. Which of the following is β-elimination reaction?

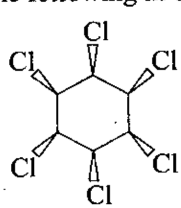
(a)  + NaOH ⟶ 

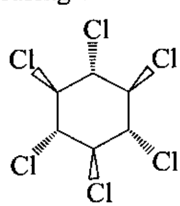
(b) $CHBr_3 + Me_3C\overset{\ominus}{O}\overset{\oplus}{K} \longrightarrow :CBr_2$

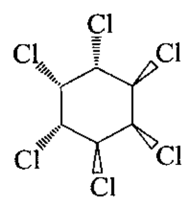
(c) $H_3C{-}\underset{CH_3}{\overset{CH_3}{C}}{-}Br$ + KOH (alc.) ⟶ 

(d)  + NaOH ⟶ 

111. Arrange the following in decreasing order of E_2 reaction :

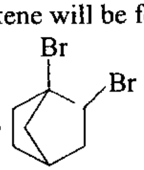

(*X*)

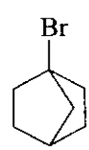

(*Y*)

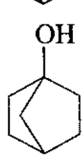

(*Z*)

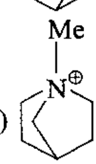
(a) $X > Y > Z$ (b) $X > Z > Y$ (c) $Z > X > Y$ (d) $Y > X > Z$

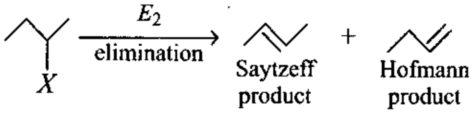
112. Which of the following reactions will undergo an elimination reaction and an alkene will be formed in the product?

(a)  $\xrightarrow[\Delta]{Zn}$

(b)  $\xrightarrow{\overset{\ominus}{O}H, \Delta}$

(c)  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$

(d)  $\xrightarrow{\overset{\ominus}{O}H, \Delta}$

113. 

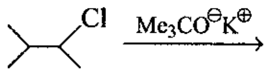
In the above reaction, maximum Saytzeff product will be obtained where X is :

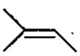
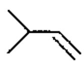
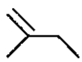
(a) —I (b) —Cl (c) —Br (d) —F

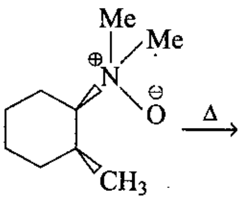
114. In the above reaction (Question no. 113) Hofmann product is major when base is :

(a) $CH_3\overset{\ominus}{O}$ (b) $CH_3CH_2\overset{\ominus}{O}$ (c) $H_3C-\overset{CH_3}{\underset{CH_3}{C}}-\overset{\ominus}{O}$ (d) $\begin{matrix}H_3C\\H_3C\end{matrix}\!\!>CH-\overset{\ominus}{O}$

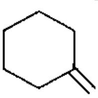
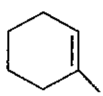
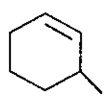
115. Find the major product of the reaction :

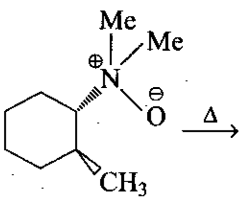


(a)  (b)  (c)  (d) Both (a) and (b)

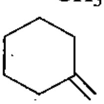
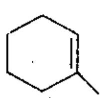
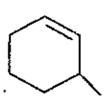
116. 

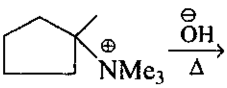
Major product :

(a)  (b)  (c)  (d) None of these

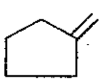
117. 

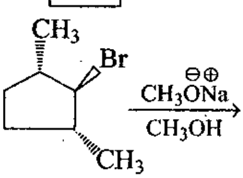
Major product :

(a)  (b)  (c)  (d) None of these

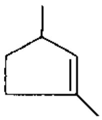
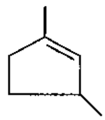
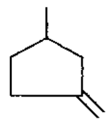
118. 

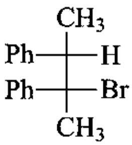
Major product :

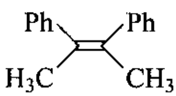
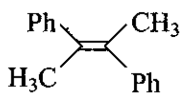
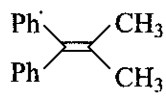
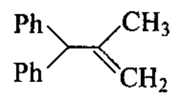
(a)  (b)  (c)  (d) 

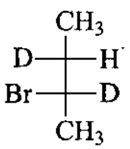
119. 

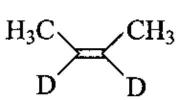
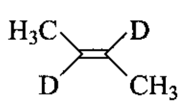
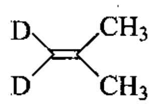
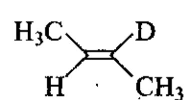
Product :

(a)  (b)  (c)  (d) No reaction

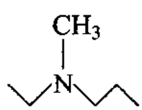
120.  $\xrightarrow{\text{alc. KOH}}$ Major product :

(a)  (b)  (c)  (d) 

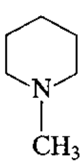
121.  $\xrightarrow{NaNH_2}$ Major product :

(a)  (b)  (c)  (d) 

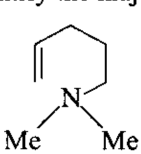
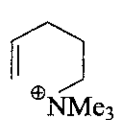
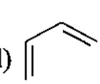
122. Identify the major product of the reaction :

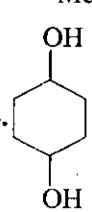
 $\xrightarrow[\Delta]{PhCO_3H}$

(a)  (b)  (c) $H_2C{=}CH_2$ (d) 

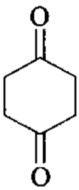
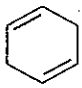
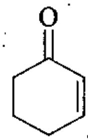
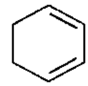
123.  $\xrightarrow[\text{AgOH}, \Delta]{CH_3I} X \xrightarrow[\text{AgOH}, \Delta]{CH_3I} Y$

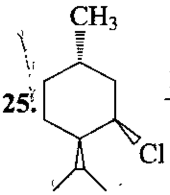
Identify the major product Y :

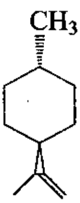
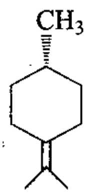
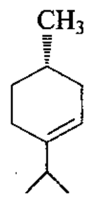
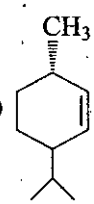
(a)  (b)  (c)  (d) 

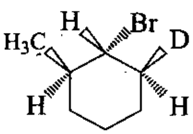
124.  $\xrightarrow[\text{pyridine}]{CH_3-\overset{O}{\overset{\|}{C}}-Cl\ (2\ \text{Mole})} X \xrightarrow{\Delta} B + CH_3COOH$

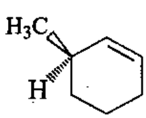
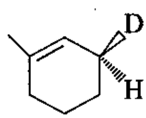
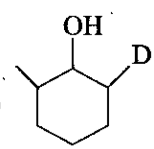
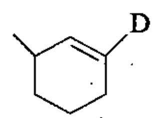
Product B of the reaction is :

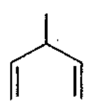
(a)  (b)  (c)  (d) 

125.  $\xrightarrow{EtO^{\ominus}Na^{\oplus}}$ Major product :

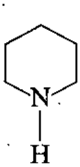
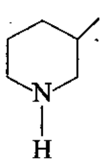
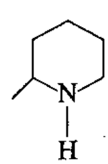
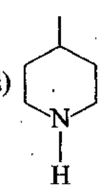
(a)  (b)  (c)  (d) 

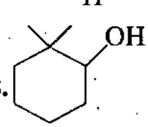
126.  $\xrightarrow{\text{alc. KOH}}$ Major product :

(a)  (b)  (c)  (d) 

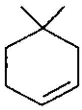
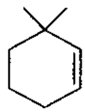
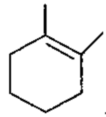
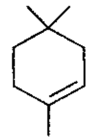
127. $X \xrightarrow[Ag_2O/H_2O,\ \Delta]{CH_3I\ (excess)} Y \xrightarrow[Ag_2O/H_2O,\ \Delta]{CH_3I\ (excess)}$ 

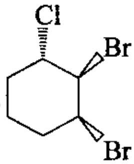
Identify 'X' :

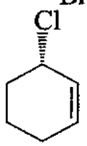
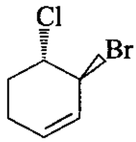
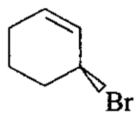
(a)  (b)  (c)  (d) 

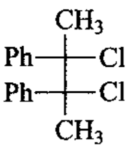
128.  $\xrightarrow[CS_2]{KH} X \xrightarrow{CH_3I} Y \xrightarrow{\Delta} Z$

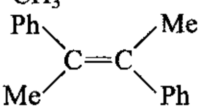
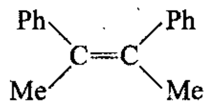
Product (Z) is :

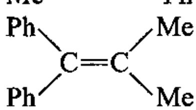
(a)  (b)  (c)  (d) 

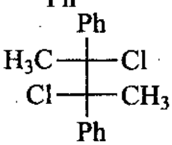
129.  $\xrightarrow{Zn,\Delta}$ Major product :

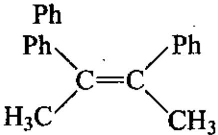
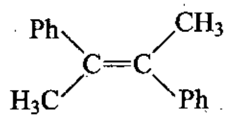
(a)  (b)  (c)  (d) None of these

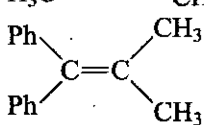
130.  $\xrightarrow{Zn,\Delta}$

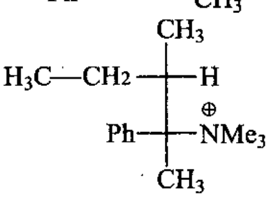
(a)  (b) 

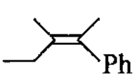
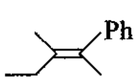
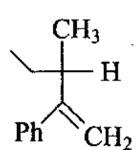
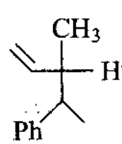
(c)  (d) No reaction

131.  $\xrightarrow[\Delta]{NaI/acetone}$

(a)  (b) 

(c)  (d) No reaction

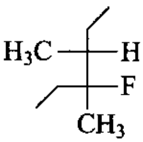
132.  $\xrightarrow[\Delta]{Ag_2O/H_2O}$ Major product :

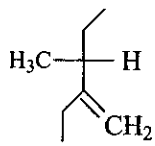
(a)  (b)  (c)  (d) 

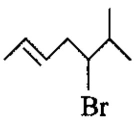
133. $Ph\text{—}CH_2\text{—}CH_2\text{—}\overset{\oplus}{N}(CH_2CH_3)(CH_2CH_2CH_3)\text{—}CH_3 \xrightarrow[\Delta]{\overset{\ominus}{O}H}$ Major Product :

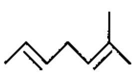
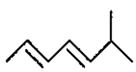
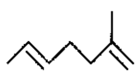
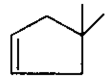
(a) $H_2C{=}CH_2$ (b) $Ph\text{—}CH{=}CH_2$

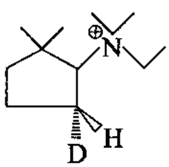
(c) $H_3C\text{—}CH{=}CH_2$ (d) $Ph\text{—}\underset{}{C}(CH_3){=}CH_2$

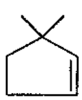
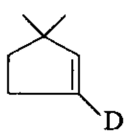
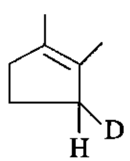
134.  $\xrightarrow{Et\overset{\ominus}{O}Na^{\oplus}}$

(a)  (b)  (c)  (d) No reaction

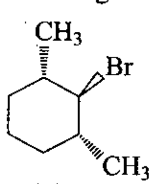
135.  $\xrightarrow{\text{alc. KOH}}$ Major product :

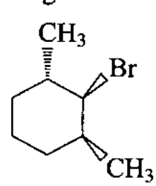
(a)  (b)  (c)  (d) 

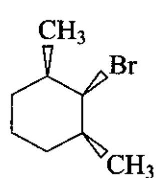
136.  $\xrightarrow[\Delta]{Ag_2O/H_2O}$ Major product :

(a)  (b)  (c)  (d) $H_2C{=}CH_2$

137. Arrange the following in decreasing order of E_2 reaction :

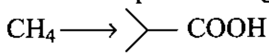

(*X*)


(*Y*)


(*Z*)

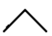
(a) $X > Y > Z$ (b) $X > Z > Y$ (c) $Y > Z > X$ (d) $Z > Y > X$

138. Which of the following is the correct option of reagent for the given conversion?

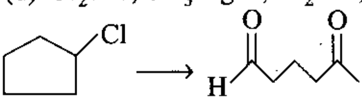


(a) $Br_2/h\nu$,  MgCl, $Br_2/h\nu$, HCOOH

(b) $Cl_2/h\nu$,  MgCl, $Br_2/h\nu$, $KCN/H_3\overset{\oplus}{O}$

(c) $Br_2/h\nu$,  MgCl, $Br_2/h\nu$, $NaNH_2$, HCN, $H_3^{\oplus}O$

(d) $Cl_2/h\nu$, CH_3MgBr, $Br_2/h\nu$, CH_3COOH

139. 

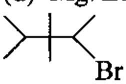
Which of the following is the correct option of reagent for the above conversion?

(a) Mg/Et_2O, CH_3Cl, $Br_2/h\nu$, alc. KOH, $KMnO_4/\overset{\ominus}{O}H$, Δ

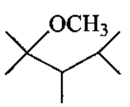
(b) $\overset{\ominus}{O}H$, H_2SO_4/Δ, O_3/Zn, H_2O

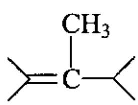
(c) CH_3MgBr, $Br_2/h\nu$, alc. KOH, $KMnO_4$, Δ

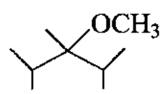
(d) Mg/Et_2O, CH_3Cl, $Br_2/h\nu$, alc. KOH, O_3/Zn, H_2O

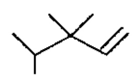
140. 

$\xrightarrow[25°C]{CH_3OH}$

(a) 

(b) 

(c) 

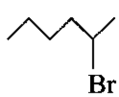
(d) 

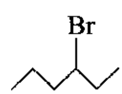
141. $A\ (C_6H_{13}Br) \xrightarrow[2.\ CH_3OH]{1.\ Mg/Ether}$ n-hexane.

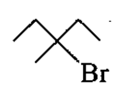
$\xrightarrow{Na/Ether}$ 4, 5- diethyloctane

Deduce the structure of 'A' :

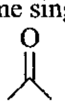
(a) 

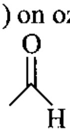
(b) 

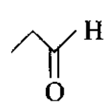
(c) 

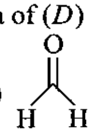
(d) 

142. Treatment of 2-bromobutane with hot alcoholic KOH gives a mixture of three isomeric butenes (A), (B) and (C). Ozonolysis of the minor product (A) gives HCHO and another aldehyde in equimolar amounts. Both (B) and (C) gave the same single product (D) on ozonolysis. Find structural formula of (D) :

(a) 

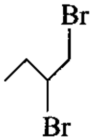
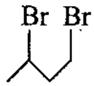
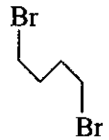
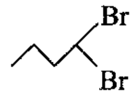
(b) 

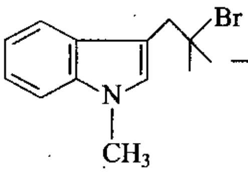
(c) 

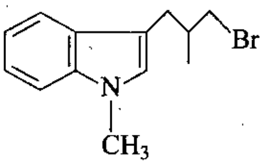
(d) 

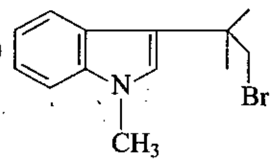
143. $A\ (C_4H_9Cl) \xrightarrow{\text{alcoholic KOH}} B \xrightarrow{Br_2/CCl_4} C \xrightarrow{NaNH_2} D \xrightarrow{[Ag(NH_3)_2]^{\oplus}}$ ppt.

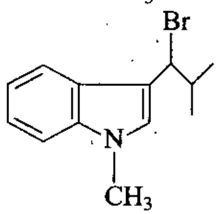
Find structure of 'C':

(a)  (b)  (c)  (d) 

144.  $\xrightarrow{\Delta}$ Major Product :

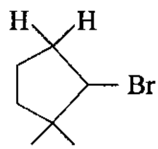
(a) 

(b) 

(c) 

(d) No reaction

145. Find the nature of following reaction :

 $\xrightarrow[\text{EtOH}]{\text{NaCN}}$

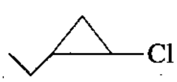
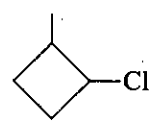
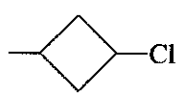
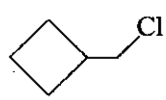
(a) S_N2 (b) S_N1 (c) E_2 (d) E_1cb

146. C_5H_9Cl (A) $\xrightarrow{\text{alc. KOH}}$ B (C_5H_8) (No isomers) $\xrightarrow[(CH_3)_2S]{O_3}$ $C_5H_8O_2$

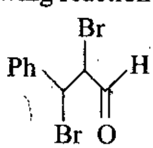
A $\downarrow$ Br_2, CCl_4 Negative test

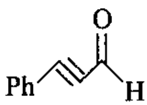
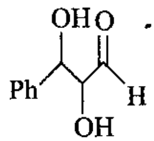
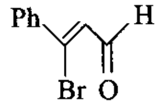
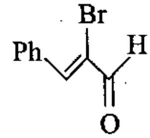
B $\downarrow$ Br_2, CCl_4 Positive test

which of the following is the structure of A?

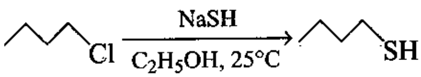
(a)  (b)  (c)  (d) 

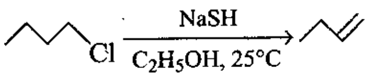
147. Consider the following reaction

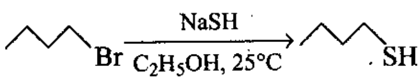
 $\xrightarrow[\Delta]{K_2CO_3}$ Major product :

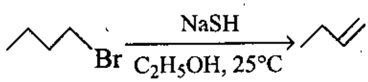
(a)  (b)  (c)  (d) 

148. Which reaction take place at the fastest rate?

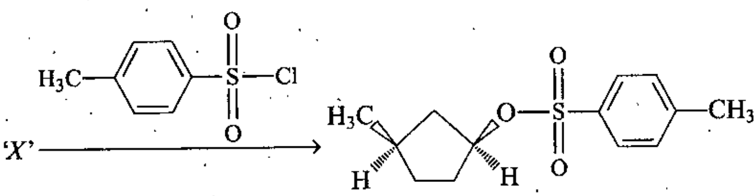
(a) 

(b) 

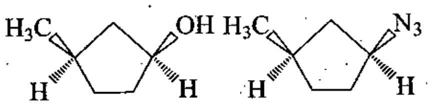
(c) 

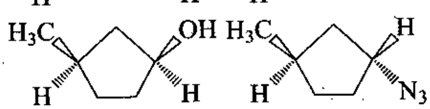
(d) 

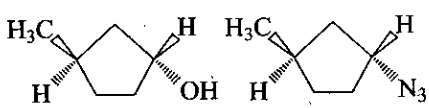
149. What are reactant X and product Y in the following sequence of reactions?

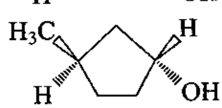


Reactant 'X' Product 'Y' $\xrightarrow[\text{ethanol-water}]{NaN_3}$ Product 'Y'

(a) 

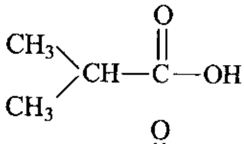
(b) 

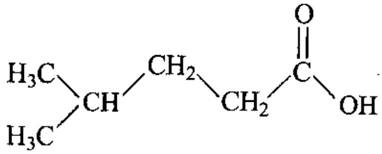
(c) 

(d)  No reaction

150. What is the major product of following reaction?

$$\begin{matrix} CH_3 \\ CH_3 \end{matrix}\!\!>\overset{\ominus\oplus}{CHLi} + CH_2{=}CH_2 \xrightarrow[H^{\oplus}/H_2O]{CO_2}$$

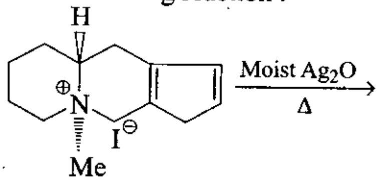
(a) 

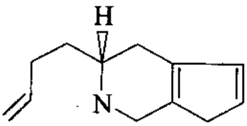
(b) 

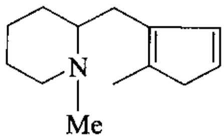
(c) $CH_2{=}CH{-}\overset{\overset{\large O}{\|}}{C}{-}OH$

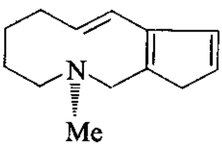
(d) All are incorrect

151. Find the major product of following reaction :

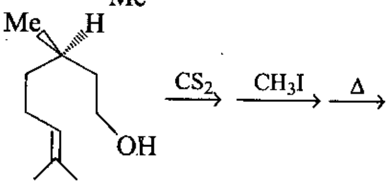


(a) 

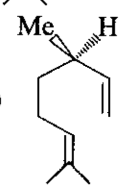
(b) 

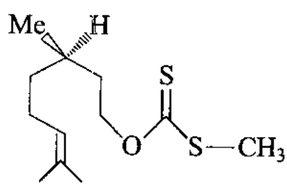
(c) 

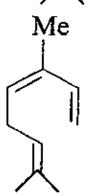
(d) No reaction

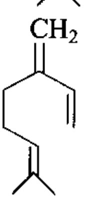
152. 

Major product :

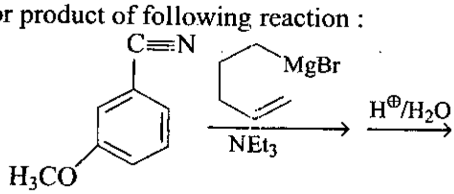
(a) 

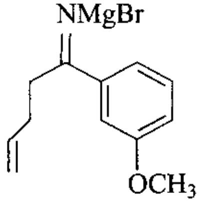
(b) 

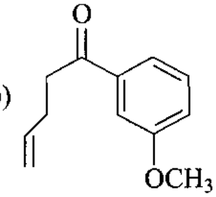
(c) 

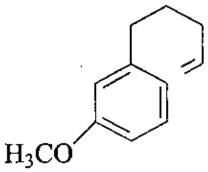
(d) 

153. Identify the major product of following reaction :



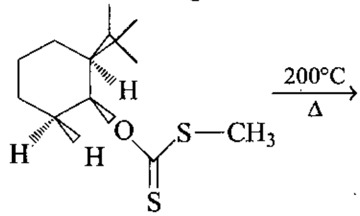
(a) 

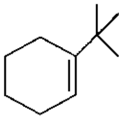
(b) 

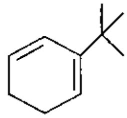
(c) 

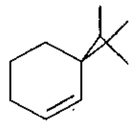
(d) No reaction

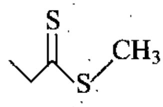
154. Identify the major product of following reaction :



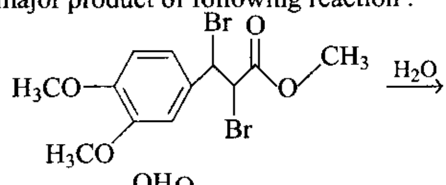
(a) 

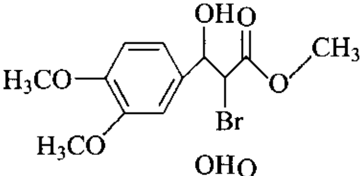
(b) 

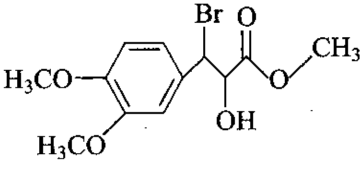
(c) 

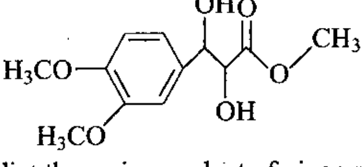
(d) 

155. Find the major product of following reaction :


Major product :

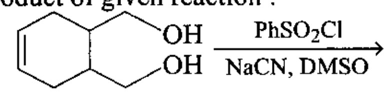
(a) 

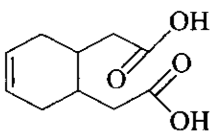
(b) 

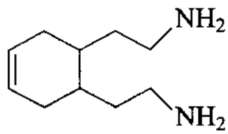
(c) 

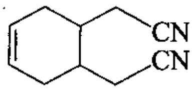
(d) Elimination reaction

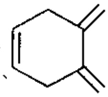
156. Predict the major product of given reaction :



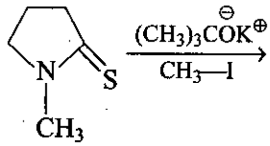
(a) 

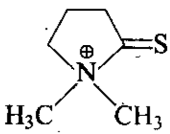
(b) 

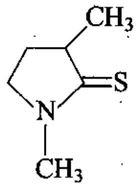
(c) 

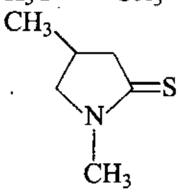
(d) 

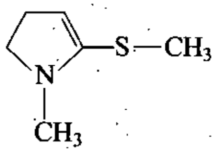
157. Predict the major product of given reaction :

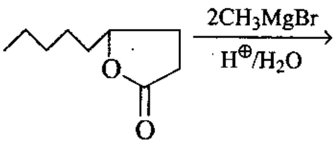


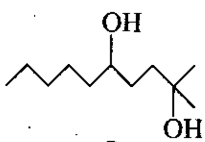
(a) 

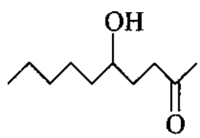
(b) 

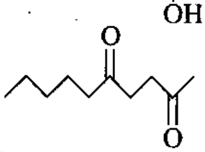
(c) 

(d) 

158.  Major product :

(a) 

(b) 

(c) 

(d) No reaction

159. $Ph—CH=N—CH_3 + Ph—CH_2MgCl \xrightarrow{H_2O}$ Major product :

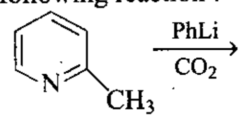
(a) $Ph—\overset{\overset{O}{\|}}{C}—H$

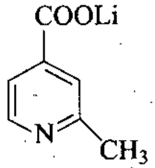
(b) $Ph—CH_2—\underset{\underset{CH_2Ph}{|}}{N}—CH_3$

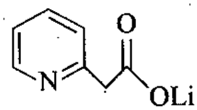
(c) $Ph—\underset{\underset{H_3C—NH}{|}}{CH}—CH_2Ph$

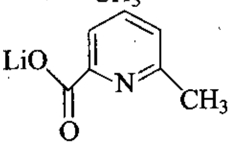
(d) None of these

160. Find the major product of following reaction :



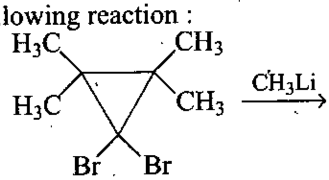
(a) 

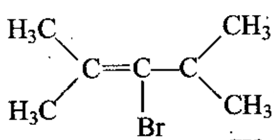
(b) 

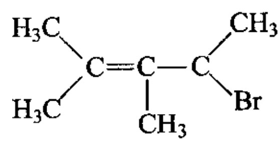
(c) 

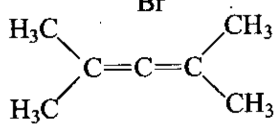
(d) No reaction

161. Find major product of following reaction :



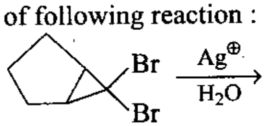
(a) 

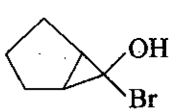
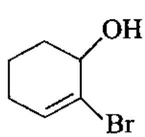
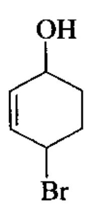
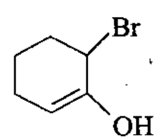
(b) 

(c) 

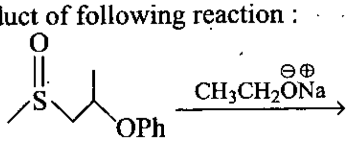
(d) None of these

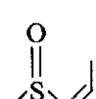
162. Predict the major product of following reaction :

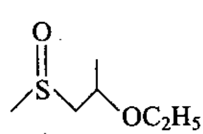


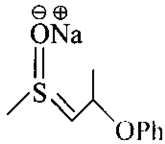
(a) 
(b) 
(c) 
(d) 

163. Predict the major product of following reaction :



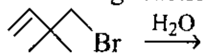
(a) 

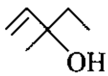
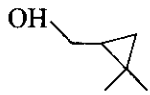
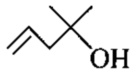
(b) 

(c) 

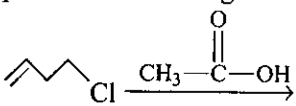
(d) No reaction

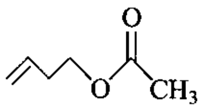
164. Identify the major product of following reaction :

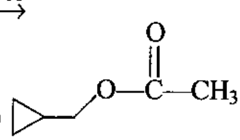


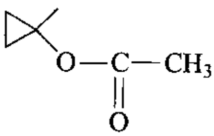
(a)  (b)  (c)  (d) 

165. Find out the major product of following reaction :



(a) 

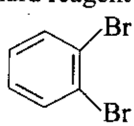
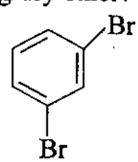
(b) 

(c) 

(d) No reaction

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which of the following will not form Grignard reagent with Mg/dry ether?

(a) $\underset{\text{Br}}{\underset{|}{\text{CH}_2}}-\underset{\text{Br}}{\underset{|}{\text{CH}_2}}$ (b)  (c)  (d) 

2. Which of the following will not give addition reaction with $RMgX$?

(a) CO_2 (b) CH_3-CH_2-Br

(c) SO_2 (d) $CH_3-\overset{\overset{\text{O}}{\|}}{\text{C}}-OH$

3. In the given reaction,

$$(X) + RMgX \text{ (excess)} \xrightarrow{H^{\oplus}/H_2O} 3^\circ \text{ Alcohol}$$

(X) may be :

(a) $R-\overset{\overset{\text{O}}{\|}}{\text{C}}-Cl$ (b) $R-\overset{\overset{\text{O}}{\|}}{\text{C}}-OC_2H_5$

(c) $R-\overset{\overset{\large O}{\|}}{C}-R$ (d) $R-\overset{\overset{\large O}{\|}}{C}-H$

4. Which of the following combinations give $C_6H_5-\underset{\underset{\large CH_2CH_3}{|}}{\overset{\overset{\large CH_3}{|}}{C}}-OH$?

(a) PhMgBr and $H_3C-\overset{\overset{\large O}{\|}}{C}-CH_2CH_3$

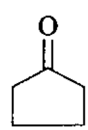
(b) CH_3MgBr and $Ph-\overset{\overset{\large O}{\|}}{C}-CH_2CH_3$

(c) CH_3MgBr and $C_6H_5-\overset{\overset{\large O}{\|}}{C}-OC_2H_5$

(d) CH_3CH_2MgBr and $Ph-\overset{\overset{\large O}{\|}}{C}-CH_3$

5. Which of the following compounds will give acid base reaction with $RMgX$?

(a) $CH_3-\overset{\overset{\large O}{\|}}{C}-Cl$ (b) H_2S

(c) $H-\overset{\overset{\large O}{\|}}{C}-O-H$ (d) 

6. Find out correct statements about Grignard reagent :

(a) The C—Mg bond of the Grignard reagent is covalent but highly polar carbon being positive relative to electronegative Mg

(b) $RMgX$ give nucleophilic addition with carbonyl compound

(c) $RMgX$ give 3° alcohol on reaction with esters

(d) $RMgX$ give nucleophilic addition elimination reaction with acid derivative

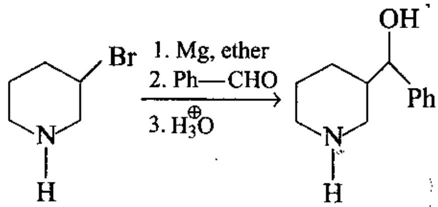
7. $R-X + Mg \xrightarrow{\text{ether}} R-MgX \xrightarrow{CH_3OH} n\text{-butane}$

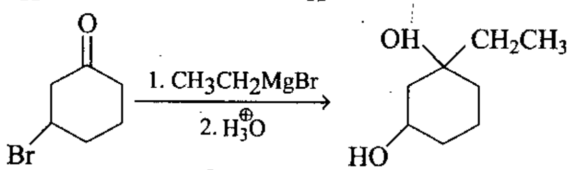
What can be R in the above reaction sequence?

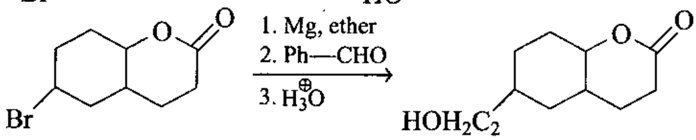
(a) *n*-propyl (b) *n*-butyl

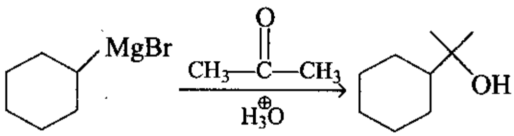
(c) *sec*- butyl (d) Isopropyl

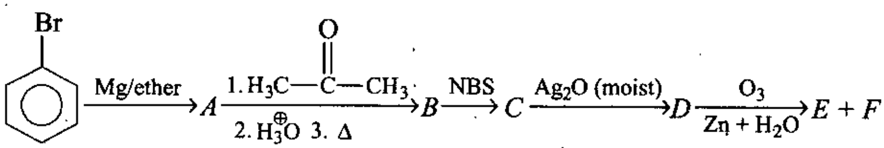
8. Point out the following incorrect Grignard synthesis :

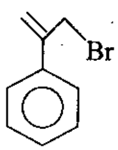
(a) 

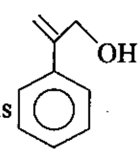
(b) 

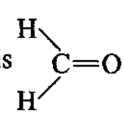
(c) 

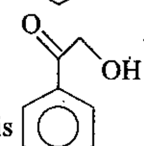
(d) 

9. 

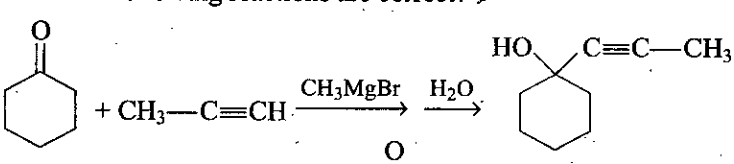
(a) Product C is 

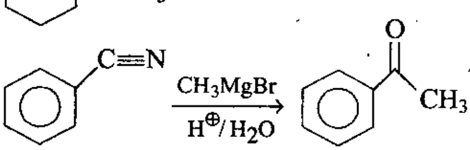
(b) Product D is 

(c) Product E is 

(d) Product F is 

10. Which of the following reactions are correct?

(a) 

(b) 

(c) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-Cl \xrightarrow[H^{\oplus}/H_2O]{PhMgBr} CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-Ph$

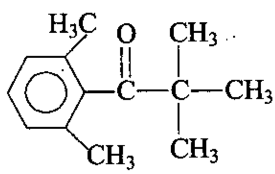
(d) $PhMgBr \xrightarrow[H^{\oplus}/H_2O]{CO_2} Ph-\overset{\overset{\displaystyle O}{\|}}{C}-OH$

11. Which of the following compounds give alcohol on reaction with $RMgX$?

(a) O_2 (b) $R-\overset{\overset{\displaystyle O}{\|}}{C}-H$ (c) $R-O-H$ (d) 

12. Which of the following ketone does not react with CH_3MgBr?

(a) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$

(b) 

(c) $H_3C-\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}-\overset{\overset{\displaystyle O}{\|}}{C}-\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}-CH_3$

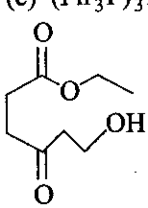
(d) $Ph-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$

13. $R-\overset{\overset{\displaystyle O}{\|}}{C}-Cl + Z \longrightarrow R-\overset{\overset{\displaystyle O}{\|}}{C}-R$

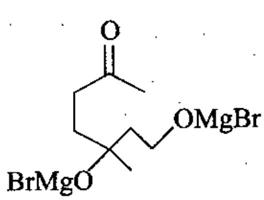
The reagent Z is :

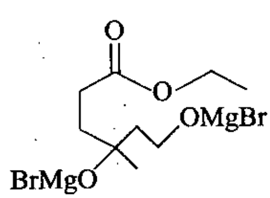
(a) R_2CuLi (b) R_2Cd

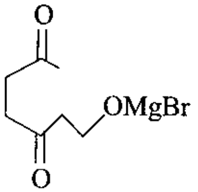
(c) $(Ph_3P)_3RhCl$ (d) $H_2-Pd/BaSO_4$

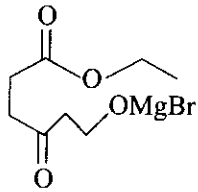
14. 

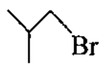
$\xrightarrow{H_3CMgBr} X \xrightarrow{H_3CMgBr} Y \xrightarrow{H_3CMgBr} Z$; then :

(a) Z is 

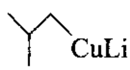
(b) Y is 

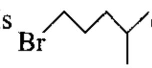
(c) Y is 

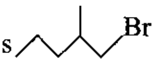
(d) X is 

15. 

$\xrightarrow[2.\ \text{CuI}]{1.\ \text{Li}} X \xrightarrow{Y}$ 2, 7-dimethyl; then :

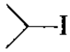
(a) X is 

(b) X is  CuLi
(c) Y is 

(d) Y is 

16. Choose the correct among the following statements :

(a) 

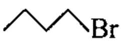
will react more readily than 

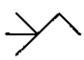
for S_N2 reaction

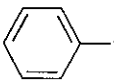
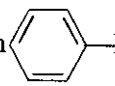
(b) 

will react more readily than 

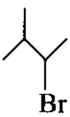
for S_N2 reaction

(c) 

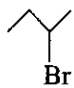
will react more readily than 
Br for S_N2 reaction

(d) 
—CH_2Br will react more readily than 
—Br for S_N2 reaction

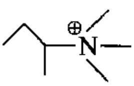
17. In which product formation takes place according to Hofmann's rule?

(a) 

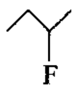
$\xrightarrow{Me_3C\overset{\ominus}{O}\overset{\oplus}{K}}$

(b) 

$\xrightarrow{CH_3CH_2\overset{\ominus}{O}\overset{\oplus}{K}}$

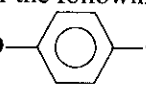
(c) 

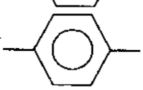
$\xrightarrow[\Delta]{\overset{\ominus}{O}H}$

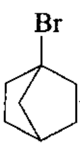
(d) 

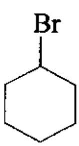
$\xrightarrow{CH_3CH_2\overset{\ominus}{O}\overset{\oplus}{K}}$

18. Consider the following statements and pick up the correct statements :

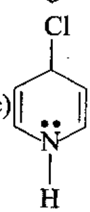
(a) MeO——CH_2—Br will react more readily than

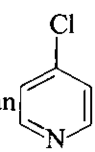
O_2N——CH_2Br for S_N1 reaction

(b) 

will react more readily than 

for S_N1 reaction

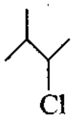
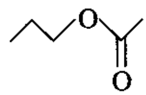
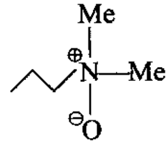
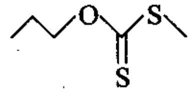
(c) 

will react more readily than 

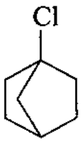
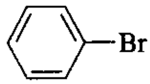
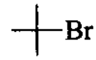
for S_N1 reaction

(d) S_N1 reaction occurs in polar protic solvent

19. Which of the following compounds will give *syn*-elimination reaction?

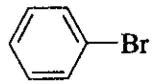
(a)  (b)  (c)  (d) 

20. Which of the following compounds will not give S_N2 reaction?

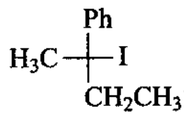
(a)  (b) $H_2C{=}CH{-}Cl$ (c)  (d) 

21. Which of the following compounds will give S_N1 reaction?

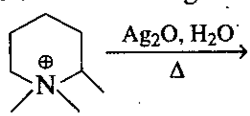
(a) $H_3C{-}CH_2{-}Br$

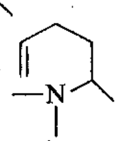
(b) 

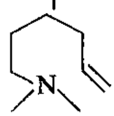
(c) $H_3C{-}\ddot{\underset{\cdot\cdot}{O}}{-}CH_2{-}Cl$

(d) 

22. Which of the following are correct for the given reaction?



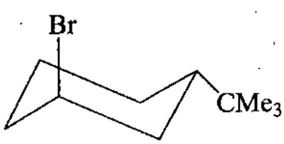
(a) Major product of reaction is 

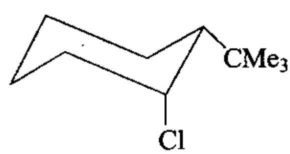
(b) Major product of reaction is 

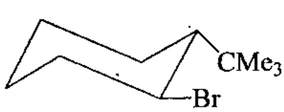
(c) Hofmann's alkene is major product of reaction

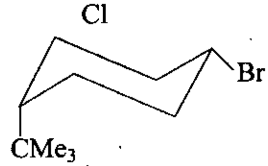
(d) Reaction is unimolecular

23. Which of the following halides undergo E_2 elimination?

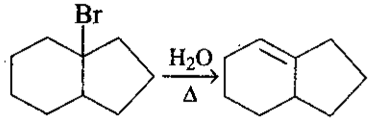
(a) 

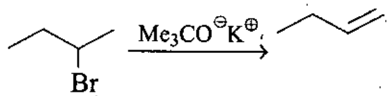
(b) 

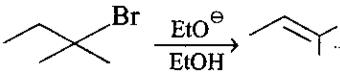
(c) 

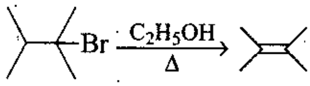
(d) 

24. In which of the following cases, the major product has been correctly shown?

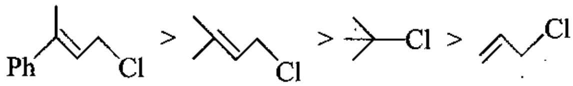
(a) 

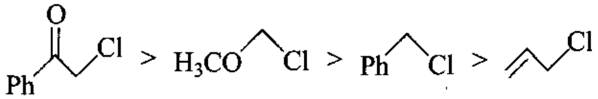
(b) 

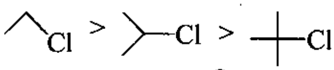
(c) 

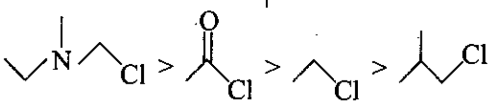
(d) 

25. Pick the correct orders of reactivity :

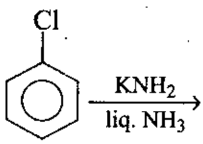
(a) $S_N1 \longrightarrow$ 

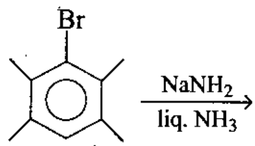
(b) $S_N2 \longrightarrow$ 

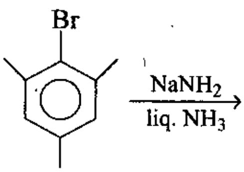
(c) $E_2 \longrightarrow$ 

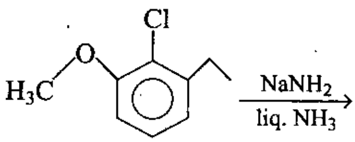
(d) $S_N1 \longrightarrow$ 

26. Which of the following reactions are not feasible?

(a) 

(b) 

(c) 

(d) 

27. Alkyl iodide can be prepared by :

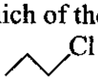
(a) $R—CH_2COOAg + I_2 \xrightarrow{CCl_4}$

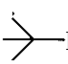
(b) $R—CH_2—Cl + NaI \xrightarrow{\text{acetone}}$

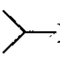
(c) $R—OH + HI \longrightarrow$

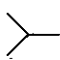
(d) $CH_4 + I_2 \xrightarrow{h\nu}$

28. Which of the following are S_N2 reactions?

(a)  $+ I^{\ominus} \longrightarrow$

(b)  Br + $^{\ominus}CN \longrightarrow$

(c)  Br + $\overset{\ominus}{O}H$ (aq.) $\longrightarrow$

(d)  Br + $\overset{\ominus}{O}H$ (alc.) $\longrightarrow$

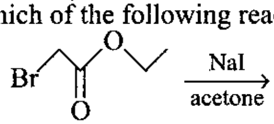
29. Which of the following reagents can be used to prepare an alkyl halide from an alcohol?

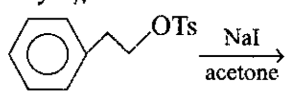
(a) NaCl (b) $SOCl_2$ (c) PCl_5 (d) $HCl + ZnCl_2$

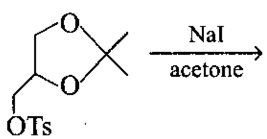
30. $H_2C{=}CH{-}Cl$ can undergo :
(a) addition reaction
(b) elimination reaction
(c) substitution reaction
(d) electrophilic substitution reaction

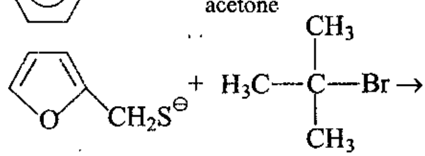
31. Aryl halide undergo :
(a) Fittig reaction
(b) Ulmann reaction
(c) Wurtz reaction
(d) Grignard reagent synthesis

32. Which of the following reactions take place by S_N2 reaction?

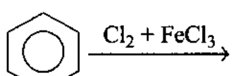
(a) 

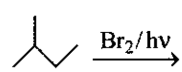
(b) 

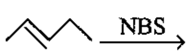
(c) 

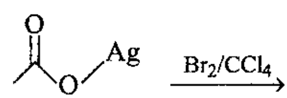
(d) 

33. Which of the following reactions involve free radical as intermediate?

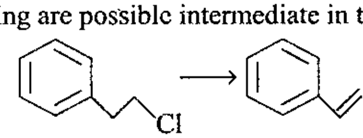
(a) 

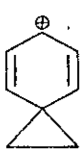
(b) 

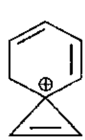
(c) 

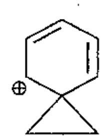
(d) 

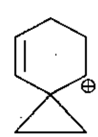
34. Which of the following are possible intermediate in the following reaction?



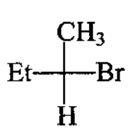
(a) 

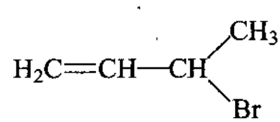
(b) 

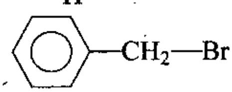
(c) 

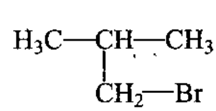
(d) 

35. Which of the following compounds will give racemic mixture by S_N1 reaction?

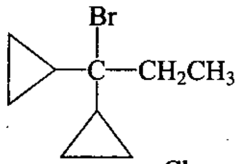
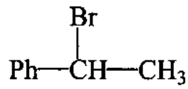
(a) 

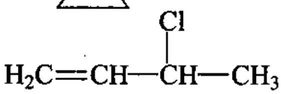
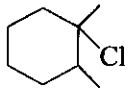
(b) 

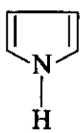
(c) 

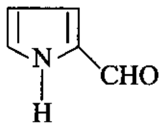
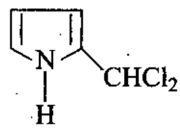
(d) 

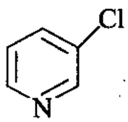
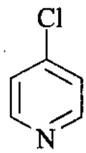
36. Which of the following compounds will give E_1 reaction?

(a) 
(b) 

(c) 
(d) 

37.  $+ CHCl_3 \xrightarrow{KOH} X$ and Y:

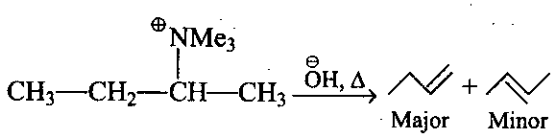
(a) X is 
(b) X is 

(c) Y is 
(d) Y is 

38. $R-CH_2-CH_2-\overset{\ominus\oplus}{O}Na \xrightarrow[CH_3-I]{CS_2} \xrightarrow{\Delta}$ gives :

(a) $R-CH_2-CH_2-I$
(b) $R-CH=CH_2$
(c) $R-CH_2-SH$
(d) H_3C-SH

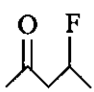
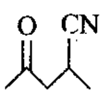
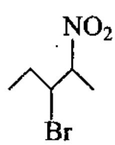
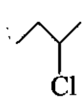
39. For the reaction



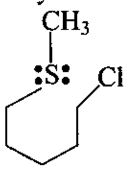
Choose the correct statements :

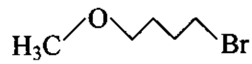
(a) The reaction is E_1 elimination
(b) The reaction is E_2 elimination
(c) Transition state has carbanion like character
(d) Transition state has carbocation like character

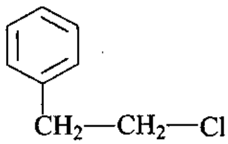
40. Which of the following can give E_1cb reaction?

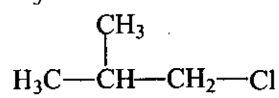
(a) 
(b) 
(c) 
(d) 

41. Identify the compounds which may give NGP reaction :

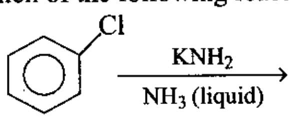
(a) 

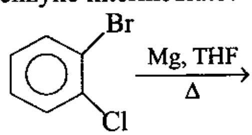
(b) 

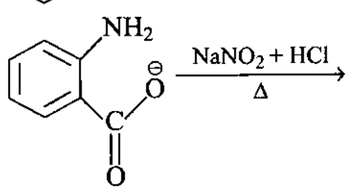
(c) 

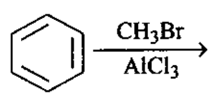
(d) 

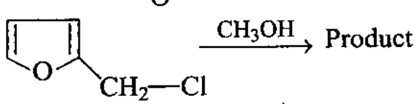
42. Which of the following reactions involve benzyne intermediate?

(a) 

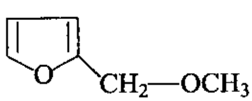
(b) 

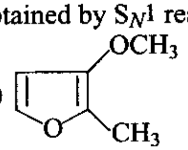
(c) 

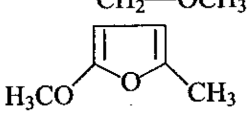
(d) 

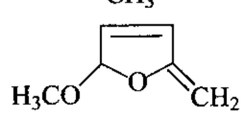
43. 

Which of the following products can be obtained by S_N1 reaction?

(a) 

(b) 

(c) 

(d) 

44. Among the following pair of reactions in which pair second reaction is more reactive than first for S_N1 reaction?

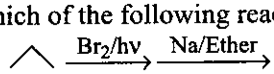
(a) $Me_3C—Cl + H_2O$ and $Me_3C—Br + H_2O$

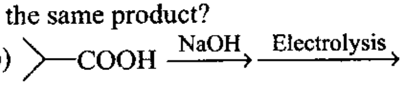
(b) $Me_3C—Cl + CH_3OH$ and $Me_3C—Cl + H_2O$

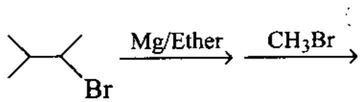
(c) $\underset{(1\,M)}{Me_3C—Cl} + H_2O$ and $\underset{(2\,M)}{Me_3C—Cl} + H_2O$

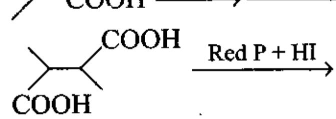
(d) $Me_3C—Cl + CH_3SH$ and $Me_3C—Cl + CH_3OH$

45. Which of the following reactions produce the same product?

(a) 

(b) 

(c) 

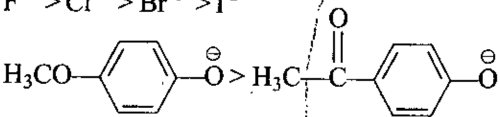
(d) 

46. Which of the following are correct order of nucleophilicity in $CH_3\dot{O}H$?

(a) $\ddot{N}H_3 < \ddot{N}H_2-\ddot{N}H_2$

(b) $CH_3CH_2\overset{\ominus}{O} > \overset{\ominus}{O}H > CH_3-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{O}$

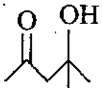
(c) $F^{\ominus} > Cl^{\ominus} > Br^{\ominus} > I^{\ominus}$

(d) 

47. Which of the following can give E_1 cb reaction in basic medium?

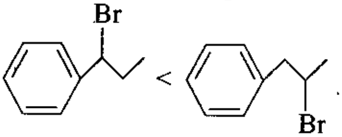
(a) $CH_3-\underset{}{\overset{OH}{\overset{|}{C}H}}-C\equiv N$

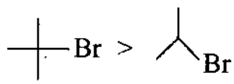
(b) $Cl-\overset{H}{\overset{|}{\underset{Cl}{\underset{|}{C}}}}-CF_3$

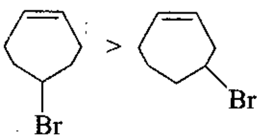
(c) 

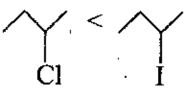
(d) HCF_2-CCl_3

48. Choose the correct comparison of reactivity toward E_2 reaction :

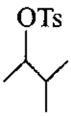
(a) 

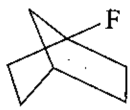
(b) 

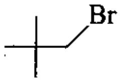
(c) 

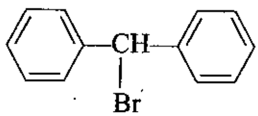
(d) 

49. Which of the following compounds cannot give E_2 reaction with strong base?

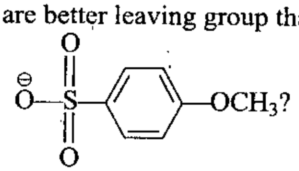
(a) 

(b) 

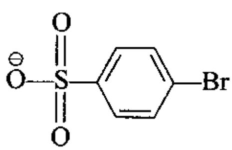
(c) 

(d) 

50. Which of the following are better leaving group than



(a) $\overset{\ominus}{O}-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-CF_3$

(b) 

(c) $-\overset{\oplus}{N}\equiv N$

(d) $-F^{\ominus}$

EXERCISE-3 LINKED COMPREHENSION TYPE

Passage-1

Optically pure $(S)-(+)$-2-bromo octane $[\alpha]_D^{25°C} = +36°$, react with aqueous NaOH in acetone to give optically pure $(R)-(-)$-2-octanol $[\alpha]_D^{25°C} = -10.3°$. With partially racemized bromo compound whose $[\alpha]_D^{25°C} = 30°$, the $[\alpha]_D^{25°}$ of the alcohol product is $-6.0°$.

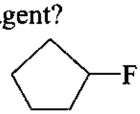
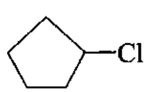
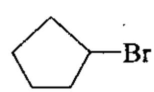
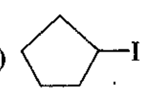
1. Calculate the per cent optical purity of partially racemized bromo compound :
   (a) 58% (b) 83%
   (c) 70% (d) 30%
2. Calculate the percentage of racemization :
   (a) 58% (b) 83% (c) 70% (d) 30%
3. Calculate the percentage of frontside attack :
   (a) 15% (b) 85% (c) 30% (d) 58%

Passage-2

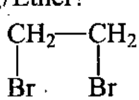
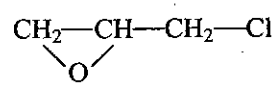
$$R\text{—}X + \text{Mg} \xrightarrow{\text{Ether, }\Delta} \overset{\delta-}{R}\text{—}\overset{\delta+}{\text{Mg}}\text{—}X$$

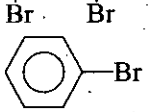
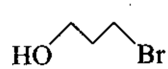
Grignard reagents may be prepared from 1°, 2° and 3° halides as well as from vinyl and aryl halide. Vicinal dihalide and those halide which contain acidic tail do not form Grignard reagent.

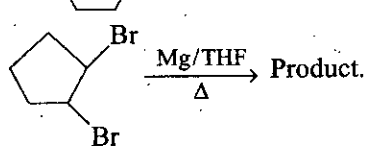
4. Which of the following halides is most reactive for the preparation of Grignard reagent?

(a)  (b)  (c)  (d) 

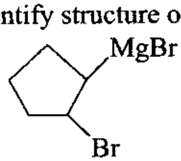
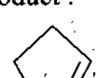
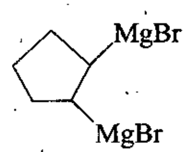
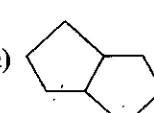
5. Which of the following compounds can form Grignard reagent on reaction with Mg/Ether?

(a)  (b) 

(c)  (d) 

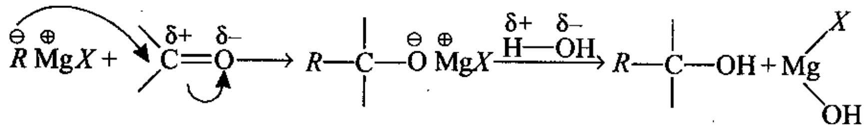
6. 

Identify structure of product :

(a)  (b)  (c)  (d) 

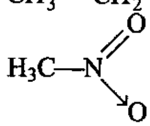
Passage-3

Since, Grignard reagents resemble carbanion, so they are strong nucleophile and strong base. Their most useful nucleophilic reaction is addition to carbonyl group.



7. Which of the following compounds will not give acid-base reaction with $RMgX$?

(a) CH_3-CH_2-Cl (b) CH_3OH

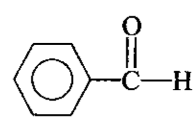
(c)  (d) H_2S

8. Which of the following compounds give racemic mixture on reaction with $H_3C-MgBr$?

(a) $H-\overset{O}{\overset{\|}{C}}-H$ (b) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

(c) $Ph-\overset{O}{\overset{\|}{C}}-H$ (d) $CH_3-\overset{O}{\overset{\|}{C}}-Cl$

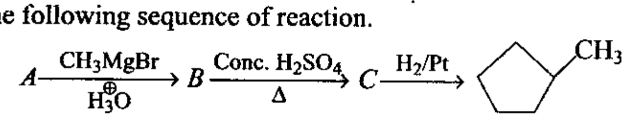
9. Arrange the following compounds in decreasing order of nucleophilic addition reaction :

$CH_3-\overset{O}{\overset{\|}{C}}-H$ (*P*) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$ (*Q*) $Cl-\overset{O}{\overset{\|}{C}}-Cl$ (*R*)  (*S*)

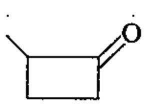
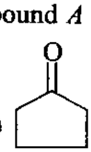
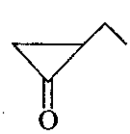
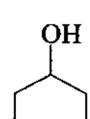
(a) $R > P > S > Q$ (b) $P > Q > R > S$
(c) $Q > R > S > P$ (d) $R > S > P > Q$

Passage-4

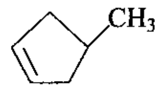
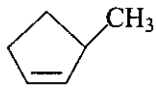
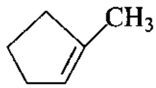
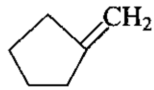
Consider the following sequence of reaction.



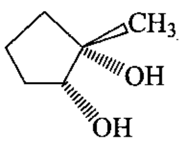
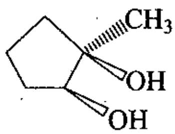
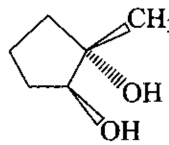
10. Find structure of compound A :

(a)  (b)  (c)  (d) 

11. Find structure of compound 'C' :

(a)  (b)  (c)  (d) 

12. $C \xrightarrow{CF_3CO_3H} \xrightarrow{H^{\oplus}/H_2O} (X)$; Identify correct structure of (X) :

(a)  (b)  (c)  (d) 

Passage-5

Williamson synthesis is an important method for the preparation of symmetrical and unsymmetrical ether. In this method halide is allowed to react with alcohol in presence of Na or K metal.

$$R—OH + R'—X \xrightarrow{\text{Na or K}} R—O—R'$$

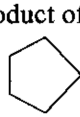
Mechanism :

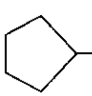
$$R—O—H \xrightarrow[\text{K}]{\text{Na or}} R—\overset{\ominus\,\oplus}{O}Na/\overset{\oplus}{K} + \frac{1}{2}H_2\uparrow$$

$$R—\overset{\ominus}{O} + R'—X \longrightarrow R—O—R'$$

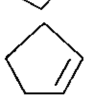
3° halides and aromatic halides do not give this reaction.

13. Find out the product of the following reaction :

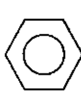
 $—OH + CH_3—CH_2—Br \xrightarrow[\text{KH}]{\text{NaH or}}$

(a)  $—\overset{\ominus}{O}\overset{\oplus}{Na}$

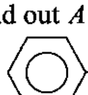
(b)  $—O—CH_2CH_3$

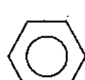
(c) 

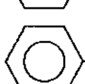
(d) $H_2C{=}CH_2$

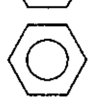
14. $A + B \xrightarrow{\text{Na}}$  $—O—CH_3$

Find out A and B :

(a)  $—Br$ and CH_3OH

(b)  $—OH$ and $CH_3—F$

(c)  $—OH$ and $CH_3—Br$

(d)  $+ CH_3OH$

15. $CH_3CH_2OH + CH_3-\underset{CH_3}{\overset{CH_3}{C}}-Cl \xrightarrow{K}$ Major product :

(a) $H_2C=C(CH_3)_2$

(b) $H_3C-\underset{CH_3}{\overset{CH_3}{C}}-O-CH_2CH_3$

(c) $CH_3CH_2\overset{\ominus\oplus}{OK}$

(d) None of these

Passage-6

Aliphatic nucleophilic substitution is mainly of two type S_N1 and S_N2 . S_N2 reaction proceed with strong nucleophile in polar aprotic solvent. 3° halides do not give S_N2 reaction. Inverted products are obtained in this reaction and mechanism of reaction occurs through the formation of transition state.

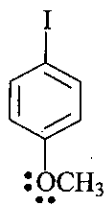
S_N1 reaction proceed through the formation of carbocation in polar aprotic solvent. Solvent itself acts as nucleophile in this reaction. Racemization takes place in S_N1 reaction.

16. Which of the following compounds will give S_N1 reaction?

(a) $Ph-\underset{Cl}{\overset{CH_3}{C}}-CH_2CH_3$

(b) H_3C-Cl

(c) H_3C-CH_2-Br

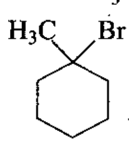
(d) 

17. Which one of the following will give racemised product in C_2H_5OH?

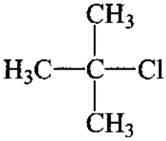
(a) $H_3C-\underset{CH_3}{CH}-Br$

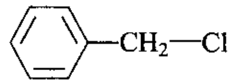
(b) $Ph-\underset{CH_3}{\overset{CH_3}{C}}-Cl$

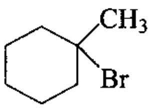
(c) $Ph-\underset{H}{\overset{CH_3}{C}}-Cl$

(d) 

18. Which one of the following will give S_N2 reaction?

(a) 

(b) 

(c) 

(d) $H_2C{=}CH{-}Cl$

Passage-7

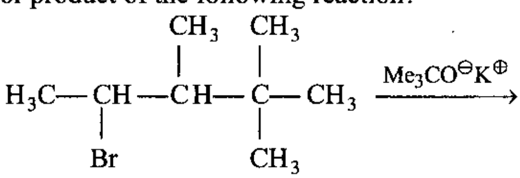
Type of elimination reaction in which least substituted alkene is major product known as Hofmann's elimination. Such reaction occur in following conditions :

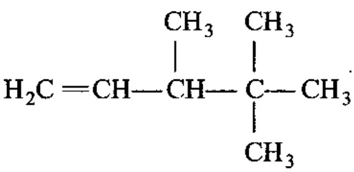
(X) when base is bulky

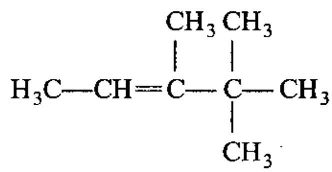
(Y) when leaving group is very poor such as fluoride, ammonium group ($-\overset{\oplus}{N}R_3$) etc.

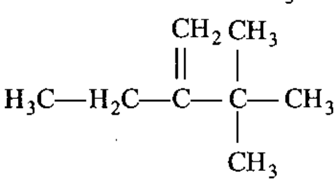
(Z) when alkyl halide contain one or more double bonds.

19. What is the major product of the following reaction?



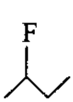
(a) 

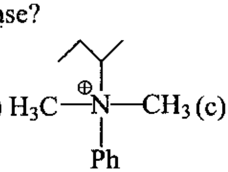
(b) 

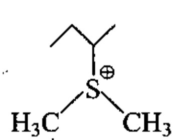
(c) 

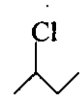
(d) None of these

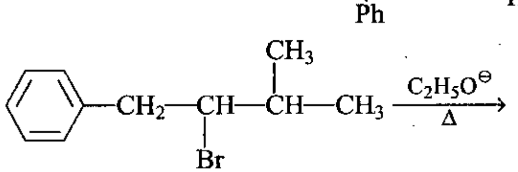
20. Which of the following will not produce Hofmann's alkene as major product on reaction with strong base?

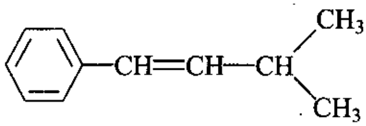
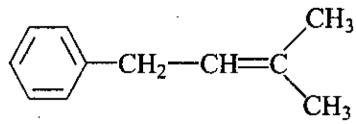
(a) 

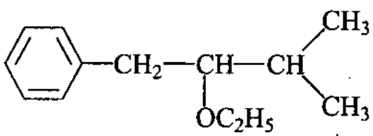
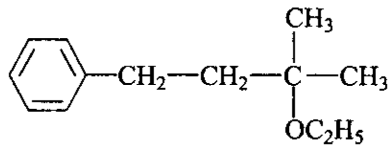
(b) 

(c) 

(d) 

21. 

(a)  (b) 

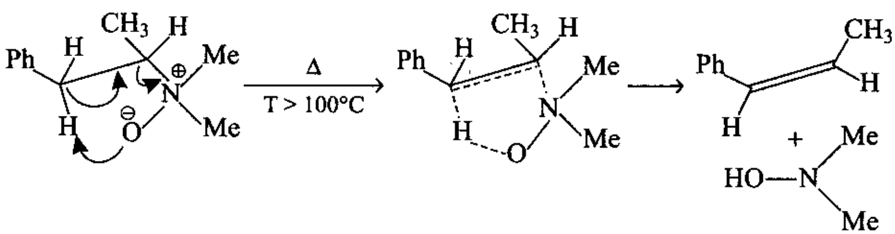
(c)  (d) 

Passage-8

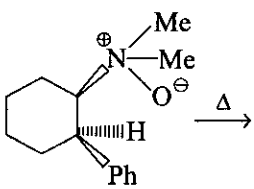
There are number of organic compounds including esters, xanthate esters, amine oxides etc., that undergo pyrolytic elimination with heat in the absence of added reagent, either in inert solvent or in the absence of solvent. In general these elimination follow the rate law.

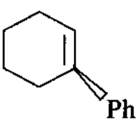
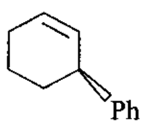
$$\text{Rate} \propto [\text{Substrate}]$$

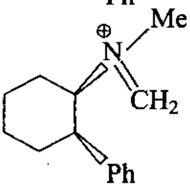
However reaction is different from E_1 elimination by the degree of *syn*-stereoselectivity that they exhibit. These reactions are also known as E_i elimination and the degree of *syn*-stereoselectivity reflect the extent to which they proceed *via* cyclic transition state.

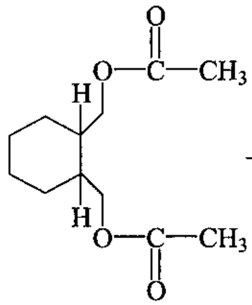


22. Find the major product of the following reaction :

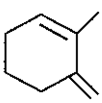
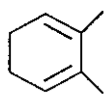
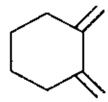
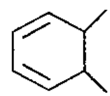


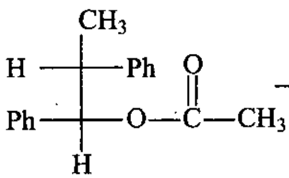
(a)  (b) 

(c)  (d) None of these

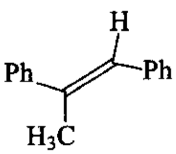
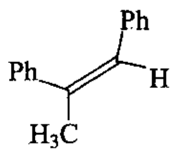
23.  $\xrightarrow{\Delta}$ Product.

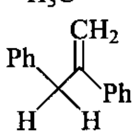
Find the structure of product :

(a)  (b)  (c)  (d) 

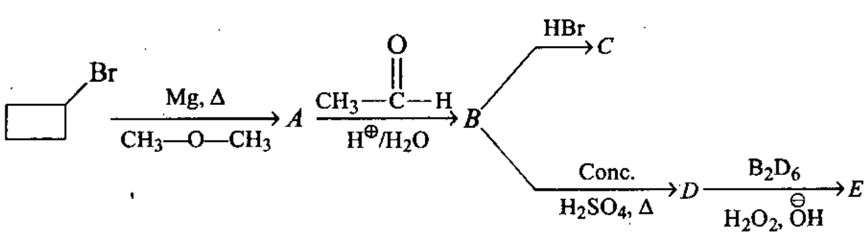
24.  $\xrightarrow{\Delta}$ Product.

Find the major product of reaction :

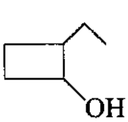
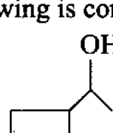
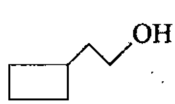
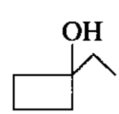
(a)  (b) 

(c)  (d) None of these

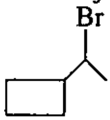
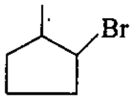
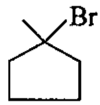
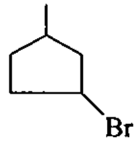
Passage-9



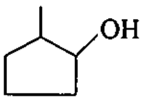
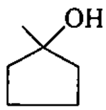
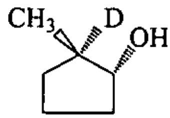
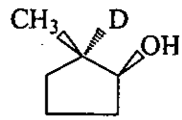
25. Which one of the following is correct structure of 'B'?

(a)  (b)  (c)  (d) 

26. Find the major product '*C*' :

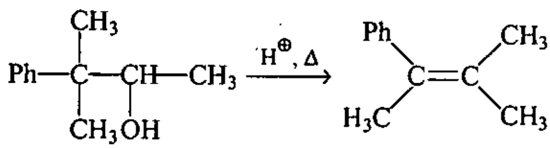
(a)  (b)  (c)  (d) 

27. Identify the structure of '*E*' :

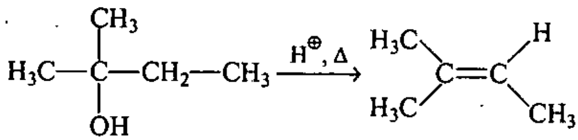
(a)  (b)  (c)  (d) 

EXERCISE-4 MATRIX MATCH TYPE

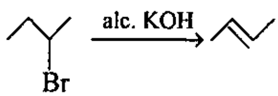
1. Column (I) — **Column (II)**

(a) 

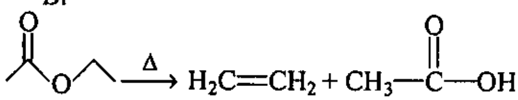
P. Elimination

(b) 

Q. Rearrangement

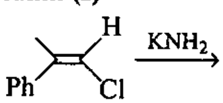
(c) 

R. Unimolecular

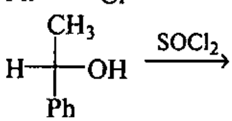
(d) 

S. Bimolecular

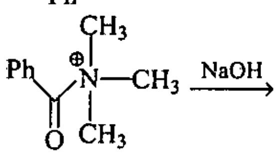
2. Column (I) — **Column (II)**

(a) 

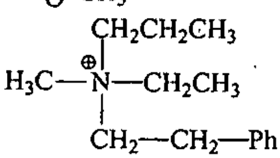
P. β-elimination

(b) 

Q. S_N2

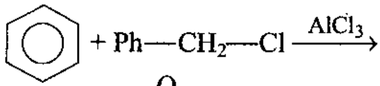
(c) 

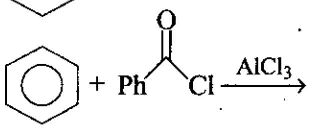
R. α-elimination

(d) 

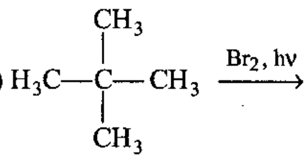
S. S_{N_i}

3. **Column (I)** | **Column (II)**

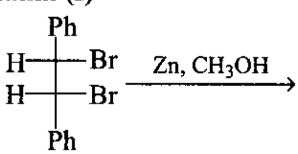
(a)  — *P*. Nucleophilic substitution

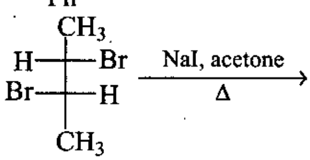
(b)  — *Q*. Electrophilic substitution

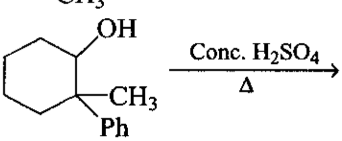
(c)  — *R*. Cation intermediate

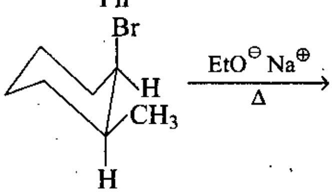
(d)  — *S*. Free radical substitution

4. **Column (I)** | **Column (II)**

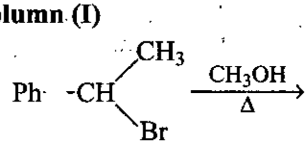
(a)  — *P*. *Anti* elimination

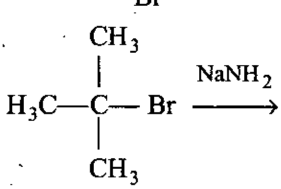
(b)  — *Q*. Rearrangement

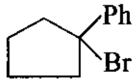
(c)  — *R*. Carbocation

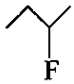
(d)  — *S*. Transition state

5. **Column (I)** | **Column (II)**

(a)  — *P*. E_1

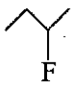
(b)  — *Q*. E_2

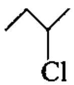
(c)  $\xrightarrow{H_2S}$ — *R.* Ist order kinetics

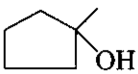
(d)  $\xrightarrow{C_2H_5O^\ominus}$ — *S.* IInd order kinetics

6. Column (I) — **Column (II)**

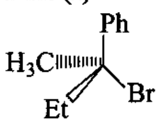
(a) $H_3C-\underset{CH_3}{\overset{CH_3}{C}}-CH_2-\underset{Br}{CH}-CH_3 \xrightarrow{Me_3C-O^\ominus K^\oplus}$ — *P.* Saytzeff's product

(b)  $\xrightarrow{CH_3CH_2O^\ominus K^\oplus}$ — *Q.* Carbocation

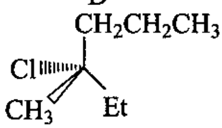
(c)  $\xrightarrow{CH_3CH_2O^\ominus Na^\oplus}$ — *R.* E_2 elimination

(d)  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$ — *S.* Hofmann product

7. Column (I) — **Column (II)**

(a)  $\xrightarrow{H_2O}$ — *P.* Inversion

(b) $CH_3-\underset{D}{CH}-Cl \xrightarrow{\overset{\ominus}{O}H\text{ (aq.)}}$ — *Q.* Racemisation

(c)  $\xrightarrow{CH_3OH}$ — *R.* Ist order

(d) $H_2C{=}CH-\underset{CH_3}{CH}-Cl \xrightarrow[\text{Acetone}]{\overset{\ominus}{S}H}$ — *S.* IInd order

8. Column (I) — **Column (II)**

(a) $PhMgBr + Cl-NH_2$ — *P.* $Ph-CN$

(b) $PhMgBr + Cl-CN$ — *Q.* $Ph-NH_2$

(c) $PhMgBr + H_3C-\overset{O}{\overset{\|}{C}}-Cl$ — *R.* $Ph-\overset{O}{\overset{\|}{C}}-CH_2CH_3$

(d) $PhMgBr + C_2H_5-\overset{O}{\overset{\|}{C}}-OC_2H_5$ — *S.* $Ph-\overset{O}{\overset{\|}{C}}-CH_3$

9. Column (I) **Column (II)**

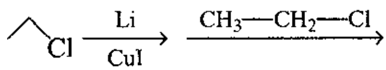
(a) $PhMgBr + CO_2 \xrightarrow{H_3^{\oplus}O}$ *P.* Nucleophilic addition reaction

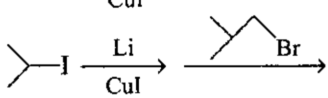
(b) $CH_3MgBr + Ph{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}Cl \xrightarrow{H_3^{\oplus}O}$ *Q.* Nucleophilic addition elimination reaction

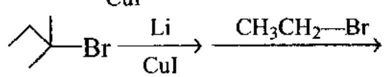
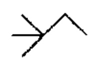
(c) $CH_3MgBr + Ph{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}OC_2H_5 \xrightarrow{H_3^{\oplus}O}$ *R.* $Ph{-}\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle OH}{|}}{C}}{-}CH_3$

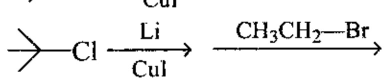
(d) $PhMgBr + CH_3{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}CH_3 \xrightarrow{H_3^{\oplus}O}$ *S.* PhCOOH

10. Column (I) **Column (II)**

(a)  *P.* 

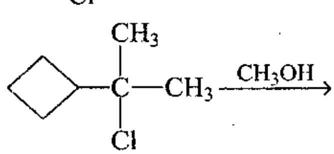
(b)  *Q.* 

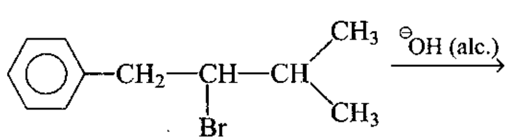
(c)  *R.* 

(d)  *S.* 

11. Column (I) **Column (II)**

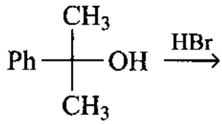
(a) $Ph{-}\underset{\underset{\displaystyle Cl}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}{-}CH(CH_3)_2 \xrightarrow{CH_3OH}$ *P.* No reaction

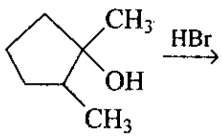
(b)  *Q.* Rearrangement

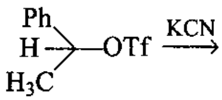
(c)  *R.* Hofmann alkene

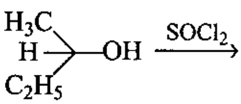
(d) $CH_3{-}\underset{\underset{\displaystyle F}{|}}{CH}{-}CH_2{-}CH_3 \xrightarrow[\Delta]{CH_3OH}$ *S.* Product can exist in stereoisomeric form

12. **Column (I)** | **Column (II)**

(a) 

(b) 

(c) 

(d) 

(*P*) Nearly total inversion

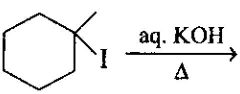
(*Q*) Nearly total retention

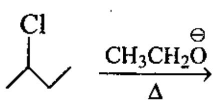
(*R*) Two step mechanism

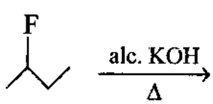
(*S*) S_N1 reaction

13. **Column (I)** | **Column (II)**

(a) $CHCl_2—CF_3 \xrightarrow[\Delta]{\text{alc. KOH}}$

(b) 

(c) 

(d) 

(*P*) Carbanion

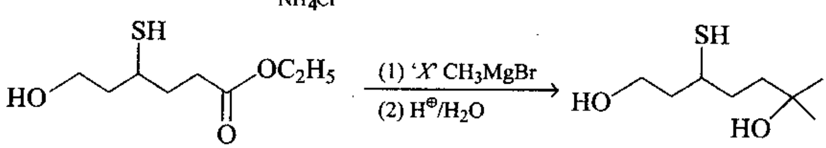
(*Q*) Two step process

(*R*) Carbocation

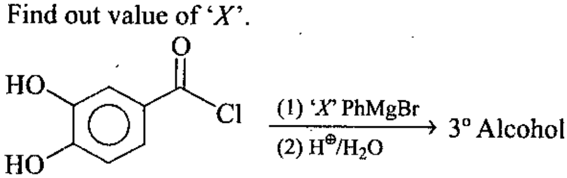
(*S*) Transition state

EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

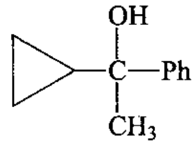
1. $Cl—\overset{\overset{O}{\|}}{C}—OC_2H_5 \xrightarrow[NH_4Cl]{(1)\ 'X'\ RMgX}$ 3° Alcohol. Find out value of '*X*'.

2. 

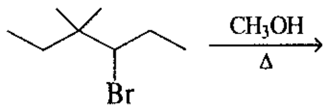
Find out value of '*X*'.

3. 

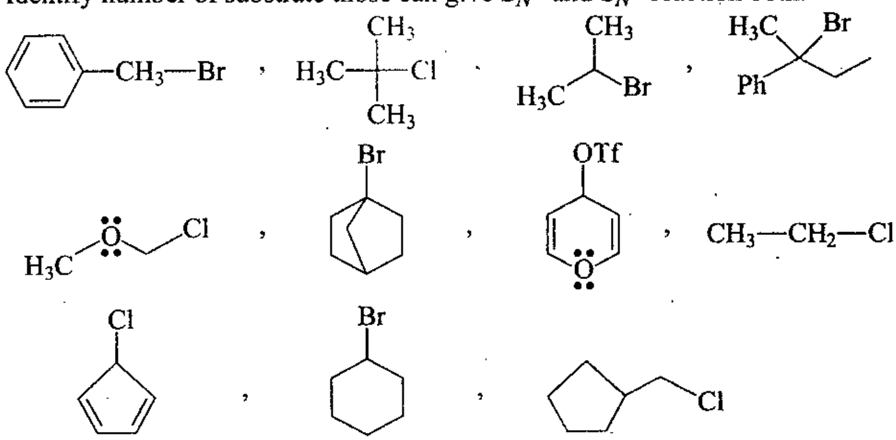
4. How many set of carbonyl compound and $RMgX$ can produce 3° alcohol.



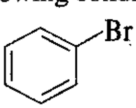
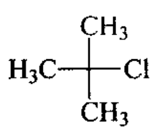
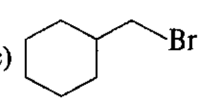
5. Find out numbers of possible E_1 products from following reaction.

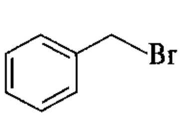
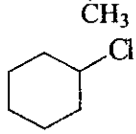
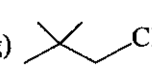
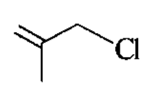


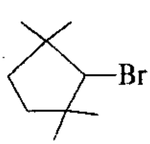
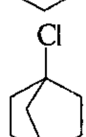
6. Identify number of substrate those can give S_N1 and S_N2 reaction both.



7. Examine the ten structures shown below and select those that satisfy each of the following condition.

(a)  (b)  (c)  (d) CH_3—I

(e)  (f)  (g)  (h) 

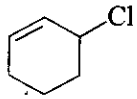
(i)  (j) 

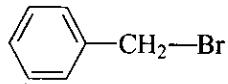
(i) How many compounds give S_N2 reaction on treatment with NaSH?

(ii) How many compounds give E_2 reaction on treatment with alcoholic KOH?

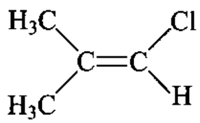
(iii) How many compounds do not react under either of the previous reaction conditions?

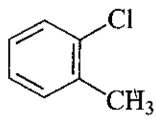
8. Examine the ten structures shown below and select those that satisfy each of the following condition.

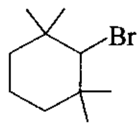
(a) 

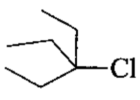
(b) 

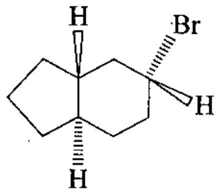
(c) CH_3—I

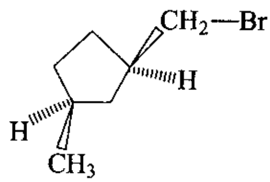
(d) 

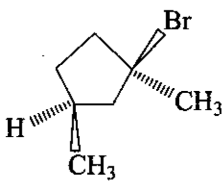
(e) 

(f) 

(g) 

(h) 

(i) 

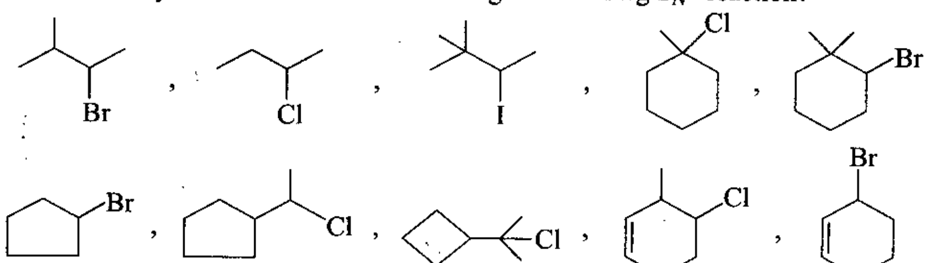
(j) 

(i) How many compounds give substitution reaction with $CH_3\overset{\ominus}{S}\overset{\oplus}{Na}$?

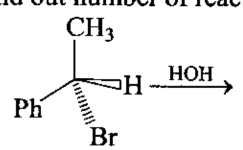
(ii) How many compounds give elimination reaction with $\overset{\oplus}{Na}\overset{\ominus}{CN}$?

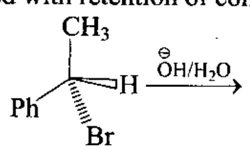
(iii) How many compounds do not react with NaOH?

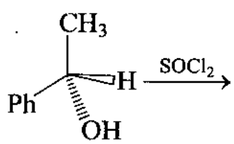
9. How many substrates will show rearrangement during S_N1 reaction?

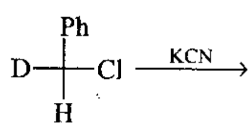


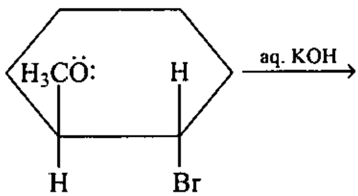
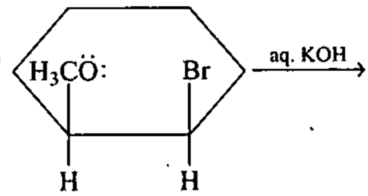
10. Find out number of reactions those proceed with retention of configuration.

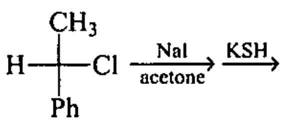
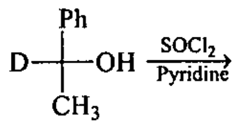
(a) 

(b) 

(c) 

(d) 

(e)  (f) 

(g)  (h) 

ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (a)	2. (a)	3. (a)	4. (b)	5. (a)	6. (d)	7. (d)	8. (d)	9. (c)	10. (b)
11. (c)	12. (b)	13. (c)	14. (c)	15. (b)	16. (b)	17. (d)	18. (a)	19. (d)	20. (b)
21. (b)	22. (a)	23. (c)	24. (b)	25. (d)	26. (b)	27. (a)	28. (c)	29. (a)	30. (b)
31. (a)	32. (c)	33. (c)	34. (d)	35. (d)	36. (a)	37. (d)	38. (b)	39. (c)	40 (c)
41. (c)	42. (c)	43. (d)	44. (a)	45. (c)	46. (a)	47. (c)	48. (c)		

Level-2

1. (d)	2. (a)	3. (a)	4. (c)	5. (a)	6. (b)	7. (c)	8. (a)	9. (b)	10. (c)
11. (d)	12. (b)	13. (a)	14. (c)	15. (b)	16. (c)	17. (a)	18. (c)	19. (d)	20. (b)
21. (c)	22. (d)	23. (b)	24. (a)	25. (c)	26. (b)	27. (c)	28. (a)	29. (b)	30. (c)
31. (d)	32. (b)	33. (c)	34. (b)	35. (c)	36. (b)	37. (a)	38. (c)	39. (d)	40 (b)
41. (c)	42. (a)	43. (c)	44. (b)	45. (a)	46. (a)	47. (b)	48. (b)	49. (c)	50. (c)
51. (b)	52. (d)	53. (a)	54. (c)	55. (a)	56. (c)	57. (b)	58. (d)	59. (a)	60. (c)
61. (b)	62. (c)	63. (a)	64. (b)	65. (d)	66. (a)	67. (c)	68. (b)	69. (d)	70. (b)
71. (c)	72. (d)	73. (b)	74. (c)	75. (b)	76. (c)	77. (b)	78. (b)	79. (d)	80. (c)
81. (b)	82. (a)	83. (d)	84. (b)	85. (d)	86. (c)	87. (a)	88. (a)	89. (c)	90. (c)
91. (a)	92. (b)	93. (b)	94. (a)	95. (b)	96. (d)	97. (c)	98. (a)	99. (d)	100. (b)
101. (a)	102. (d)	103. (c)	104. (a)	105. (a)	106. (b)	107. (a)	108. (c)	109. (a)	110. (c)
111. (b)	112. (d)	113. (a)	114. (c)	115. (b)	116. (c)	117. (b)	118. (a)	119. (d)	120. (b)
121. (a)	122. (c)	123. (b)	124. (d)	125. (c)	126. (a)	127. (d)	128. (b)	129. (c)	130. (a)
131. (a)	132. (c)	133. (b)	134. (c)	135. (b)	136. (d)	137. (d)	138. (b)	139. (d)	140. (c)
141. (c)	142. (b)	143. (a)	144. (c)	145. (a)	146. (c)	147. (d)	148. (c)	149. (b)	150. (b)
151. (c)	152. (a)	153. (b)	154. (c)	155. (a)	156. (c)	157. (d)	158. (a)	159. (c)	160. (b)
161. (c)	162. (b)	163. (a)	164. (d)	165. (b)					

Exercise-2 : More Than One Correct Answers

1. (a, b, c)	2. (b, d)	3. (a, b, c)	4. (a, b, d)	5. (b, c)	6. (b, c, d)
7. (b, c)	8. (a, c)	9. (a, b, c, d)	10. (a, b, d)	11. (a, b, d)	12. (b, c)
13. (a, b)	14. (a, b, d)	15. (b, c)	16. (a, c, d)	17. (a, c, d)	18. (a, c, d)
19. (b, c, d)	20. (a, b, c, d)	21. (c, d)	22. (b, c)	23. (a, b)	24. (b, c, d)
25. (a, b)	26. (b, c, d)	27. (a, b, c)	28. (a, c)	29. (b, c, d)	30. (a, b)
31. (a, b, d)	32. (a, b, c)	33. (b, c, d)	34. (a, c)	35. (a, b)	36. (a, b, c, d)
37. (a, c)	38. (b, d)	39. (b, c)	40. (a, b)	41. (a, b, c)	42. (a, b, c)
43. (a, b, c)	44. (a, b, c)	45. (a, b, c, d)	46. (a, b, d)	47. (a, b, c)	48. (a, b, d)
49. (b, c, d)	50. (a, b, c)				

Exercise-3 : Linked Comprehension Type

1. (b)	2. (d)	3. (a)	4. (d)	5. (c)	6. (b)	7. (a)	8. (c)	9. (a)	10. (b)
11. (c)	12. (d)	13. (b)	14. (c)	15. (a)	16. (a)	17. (c)	18. (b)	19. (a)	20. (d)
21. (a)	22. (b)	23. (c)	24. (a)	25. (b)	26. (c)	27. (c)			

Exercise-4 : Matrix Match Type

1. (a) $\rightarrow P, Q, R$;	(b) $\rightarrow P, R$;	(c) $\rightarrow P, S$;	(d) $\rightarrow P, R$
2. (a) $\rightarrow R$;	(b) $\rightarrow S$;	(c) $\rightarrow Q$;	(d) $\rightarrow P$
3. (a) $\rightarrow Q, R$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow P$;	(d) $\rightarrow S$
4. (a) $\rightarrow P, S$;	(b) $\rightarrow P, S$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow P, S$
5. (a) $\rightarrow P, R$;	(b) $\rightarrow Q, S$;	(c) $\rightarrow R$;	(d) $\rightarrow Q, S$
6. (a) $\rightarrow R, S$;	(b) $\rightarrow R, S$;	(c) $\rightarrow P, R$;	(d) $\rightarrow P, Q$
7. (a) $\rightarrow Q, R$;	(b) $\rightarrow P, S$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow P, S$
8. (a) $\rightarrow Q$;	(b) $\rightarrow P$;	(c) $\rightarrow S$;	(d) $\rightarrow R$
9. (a) $\rightarrow P, S$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow P, R$
10. (a) $\rightarrow Q$;	(b) $\rightarrow P$;	(c) $\rightarrow S$;	(d) $\rightarrow R$
11. (a) $\rightarrow S$;	(b) $\rightarrow Q, S$;	(c) $\rightarrow R, S$;	(d) $\rightarrow P$
12. (a) $\rightarrow R, S$;	(b) $\rightarrow R, S$;	(c) $\rightarrow P$;	(d) $\rightarrow Q, R$
13. (a) $\rightarrow P, Q$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow S$;	(d) $\rightarrow P, S$

Exercise-5 : Integer Answer Type Problems

1. (3) 2. (4) 3. (4) 4. (3) 5. (4) 6. (6) 7. (i) 5, C, D, E, F, H (ii) 3, B, C, F (iii) 4, A, G, I, J 8. (i) 5, A, B, C, H, I (ii) 2, G, J (iii) 3, D, E, F

9. (6) 10. 4, A, C, E, G

❑❑❑

5 Alcohol and Ethers

EXERCISE-1 ONLY ONE CORRECT ANSWER

LEVEL-1

1. An alkene obtained by the dehydration of an alcohol (A), on ozonolysis gives two molecules of acetaldehyde for every molecule of alkene. The alcohol (A) is :
   (a) $CH_3CH_2CH_2OH$
   (b) CH_3CH_2OH
   (c) $CH_3CH{=}CHCH_2OH$
   (d) $CH_3CH_2\underset{\displaystyle OH}{\underset{|}{C}H}CH_3$

2. $R—COOH \rightarrow R—CH_2OH$. This mode of reduction of an acid to alcohol can be effected by :
   (a) Zn/HCl
   (b) Na — alcohol
   (c) Aluminium isopropoxide and isopropyl alcohol
   (d) $LiAlH_4$

3. Wood $\xrightarrow{\text{Destructive distillation}} X + Y + Z$; products X, Y, Z are :
   (a) $CH_3OH, CH_3COOH, CH_3COCH_3$
   (b) $CH_3COOH, HCOOH, CH_3OH$
   (c) $CH_3OH, CH_3COOH, CH_3CHO$
   (d) $CH_3COOH, CH_3COCH_3, CH_3CHO$

4. Which of the following reaction(s) will yield propane-2-ol?
   (a) $CH_2{=}CH—CH_3 + H_2O \xrightarrow{H^+}$
   (b) $CH_3—CHO \xrightarrow[\text{(ii) } H_2O]{\text{(i) } CH_3MgI}$
   (c) $CH_2O \xrightarrow[\text{(ii) } H_2O]{\text{(i) } C_2H_5MgI}$
   (d) $CH_2{=}CH—CH_3 \xrightarrow{\text{Neutral } KMnO_4}$

5. $Z \xrightarrow{PCl_4} X \xrightarrow{\text{Alc. KOH}} Y. \xrightarrow[\text{2. } H_2O\text{, boil}]{\text{1 Conc. } H_2SO_4} Z$; Z is :
   (a) $CH_3—CH_2—CH_2—OH$
   (b) $H_3C—\underset{\displaystyle OH}{\underset{|}{C}H}—CH_3$
   (c) $(C_2H_5)_3C—OH$
   (d) $CH_3—CH{=}CH_2$

6. 1-propanol and 2-propanol can be best distinguished by :
   (a) oxidation with alkaline $KMnO_4$ followed by reaction with Fehling's solution
   (b) oxidation with acidic dichromate followed by reaction with Fehling's solution
   (c) oxidation by heating with copper followed by reaction with Fehling's solution
   (d) oxidation with conc. H_2SO_4 followed by reaction with Fehling's solution

7. On heating glycerol with $KHSO_4/\Delta$, a compound is obtained, which has a bad odour. The compound is :
(a) Acrolein
(b) Formic acid
(c) Allyl alcohol
(d) Methyl isocyanide

8. A compound X with molecular formula C_3H_8O can be oxidized to a compound Y with the molecular formula $C_3H_6O_2$. X is most likely to be a :
(a) primary alcohol
(b) secondary alcohol
(c) aldehyde
(d) ketone

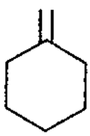
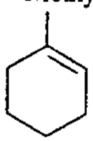
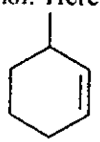
9. Identify (Z) in the following series,

$$\text{Ethanol} \xrightarrow{PBr_3} (X) \xrightarrow{\text{Alc./KOH}} (Y) \xrightarrow[\text{(ii) } H_2O\text{:heat}]{\text{(i) } H_2SO_4\text{/Room temp.}} (Z)$$

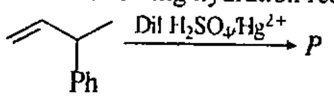
(a) $CH_2{=}CH_2$
(b) $CH_3{-}CH_2{-}OH$
(c) $CH_3{-}CH_2{-}O{-}CH_2{-}CH_3$
(d) $CH_3{-}CH_2{-}SO_3H$

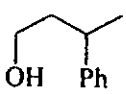
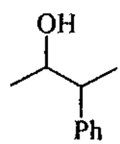
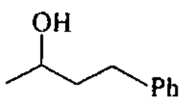
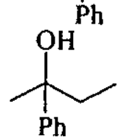
10. Which one of the following is not the characteristic of alcohols ?
(a) Their boiling points rise fairly uniformly with a rise in molecular weight
(b) Lower members have a pleasant smell but burning taste and the higher ones are odorless and tasteless
(c) These are lighter than water
(d) Lower members are insoluble in water and organic solvents but the solubility goes on increasing with the rise of molecular weight

11. $A \xrightarrow{\text{Dil. } H_2SO_4/Hg^{2+}}$ 1—Methylcyclohexanol. Here A is :

(a) 
(b) 
(c) 
(d) (a) or (b)

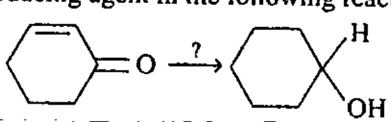
12. Predict the nature of P in the following hydration reaction of alkenes.



(a) 
(b) 
(c) 
(d) 

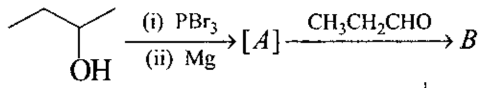
13. 2-Phenylbutan-2-ol can be prepared by which of the following combinations ?
(a) $C_6H_5COCH_3 + C_2H_5MgBr$
(b) $C_2H_5COCH_3 + C_6H_5MgBr$
(c) $C_6H_5COC_2H_5 + CH_3MgBr$
(d) All of these

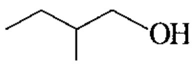
14. Predict the nature of reducing agent in the following reaction.

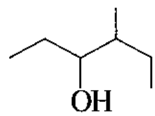


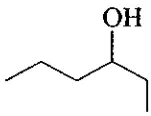
(a) $LiAlH_4$ (b) $NaBH_4$ (c) H_2/Pt (d) Both (a) and (c)

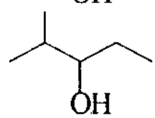
15. The correct structure for compound B will be :



(a) 

(b) 

(c) 

(d) 

16. An industrial method for the preparation of methanol is :

(a) by reacting CH_4 with steam at 900°C with a nickel catalyst

(b) by reduction of HCHO with $LiAlH_4$

(c) by catalytic reduction of CO in presence of $ZnO — Cr_2O_3$

(d) by reaction of HCHO with NaOH(aq.)

17. Absolute alcohol cannot be obtained by simple fractional distillation because

(a) pure C_2H_5OH is unstable

(b) C_2H_5OH forms hydrogen bonding with water

(c) boiling point of C_2H_5OH is very close to that of water

(d) constant boiling azeotropic mixture is formed with water

18. The product when glycerol reacts with PCl_5 is :

(a) 1, 2, 3 — trichloropropane (b) glycero monochlorohydrin

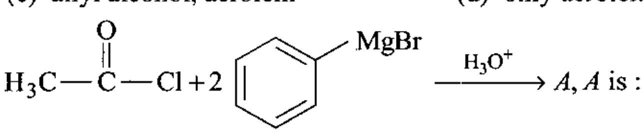
(c) glycero dichlorohydrin (d) all of these

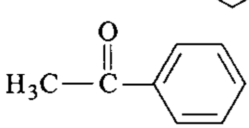
19. Glycerol $\xrightarrow{KHSO_4} A \xrightarrow{LiAlH_4} B.$

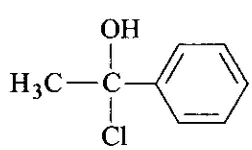
A and B are :

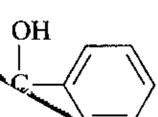
(a) acrolein, allyl alcohol (b) glyceryl sulphate, acrylic acid

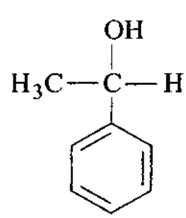
(c) allyl alcohol, acrolein (d) only acrolein (B is not formed)

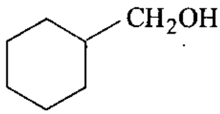
20. 

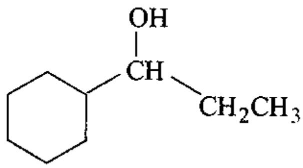
(a) 

(b) 



(d) 

21.  is changed into

 by :

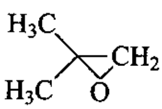
(a) (i) Cu, 300°C (ii) CH_3CH_2MgBr, H_3O^+
(b) (i) CrO_3, (ii) CH_3CH_2MgBr, H_3O^+
(c) (i) $KMnO_4$ (ii) CH_3CH_2MgBr, H_3O^+
(d) (i) $Na_2Cr_2O_7 + H_2SO_4$ (ii) CH_3CH_2MgBr, H_3O^+

22. The conversion

$$H_3C-\overset{\overset{\large O}{\|}}{C}-CH_2CH_2CO_2CH_3 \rightarrow H_3C-\overset{\overset{\large OH}{|}}{CH}-CH_2CH_2CH_2OH$$

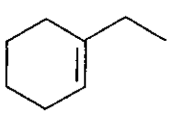
can be effected using :

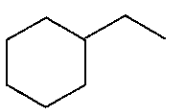
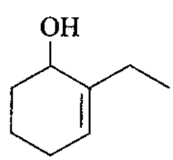
(a) $LiAlH_4$ and then H^+ (b) $NaBH_4$ and then H^+
(c) H_2/Pt carbon (d) All

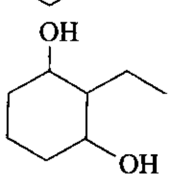
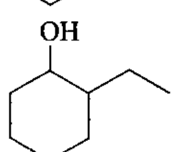
23.  $\xrightarrow{LiAlH_4} A$, A is :

(a) $CH_3\underset{\underset{\large CH_3}{|}}{C}HCH_2OH$ (b) $CH_3CH_2CH_2CH_2OH$

(c) $CH_3\overset{\overset{\large CH_3}{|}}{\underset{\underset{\large CH_3}{|}}{C}}-OH$ (d) no reaction

24.  $\xrightarrow{SeO_2} A, A$ is :

(a)  (b) 

(c)  (d) 

25. Which of the following can be obtained from a mixture of ethanol and concentrated sulphuric acid, if the composition of the mixture and the reaction conditions are suitably adjusted ?

(a) C_2H_4 (b) $(C_2H_5)_2SO_4$
(c) $CH_3CH_2OCH_2CH_3$ (d) $CH_3CH_2HSO_4$

26. An aromatic amine (X) was treated with alcoholic potash and another compound (Y), a foul smelling gas was formed with formula C_6H_5NC. (Y) was formed by reacting a compound (Z) with Cl_2 in the presence of slaked lime. The compound (Z) is :

(a) $C_6H_5NH_2$ (b) C_2H_5OH (c) CH_3OCH_3 (d) $CHCl_3$

27. An alcohol (A) on dehydration gives (B), which on ozonolysis gives acetone and formaldehyde. (B) decolourises alkaline $KMnO_4$ solution but (A) does not. (A) and (B) are respectively :

(a) $CH_3CH_2CH_2CH_2OH$ and $CH_2CH_2CH{=}CH_2$
(b) $CH_2CH_2-\underset{OH}{\underset{|}{CH}}-CH_2$ and $CH_2-CH{=}CH-CH_2$
(c) $(CH_3)_3C-OH$ and $(CH_3)_2C{=}CH_2$
(d) $(CH_3)_3CHCH_2-OH$ and $(CH_3)_2C{=}CH_2$

28. Absolute alcohol can be obtained from rectified spirit by :

(a) fractional distillation (b) azeotropic distillation
(c) vacuum distillation (d) steam distillation

29. If phenyl magnesium bromide and acetaldehyde are the reactants, the product formed after hydrolysis would be :

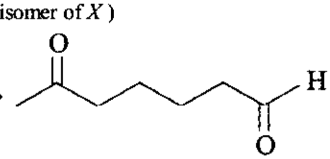
(a) benzyl alcohol (b) 1-Phenylethanol
(c) 2-Phenylethanol (d) Acetone

30. Which set of the following reagents (A to D) would you select to convert $C_6H_5COCH_3$ (acetophenone) to the following alcohol ?

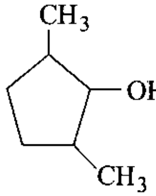
$$C_6H_5-\underset{OH}{\underset{|}{\overset{\overset{CH_3}{|}}{C}}}-\overset{\overset{CH_3}{|}}{CH}-CH_3$$

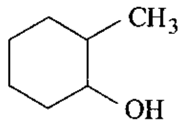
(a) $CH_3CH_2CH_2MgBr$ and hydrolysis
(b) $CH_3CH(Br)CH_3 \cdot AlCl_3$
(c) $(CH_3)_2CHMgBr$ and acid hydrolysis
(d) $CH_3CHCHCH_3, Zn$

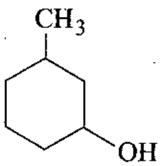
31. $\underset{(A\ 3^\circ \text{ alcohol})}{C_7H_{14}O(X)} \xrightarrow[\Delta]{H^+} C_7H_{12}(Y) \xrightarrow[2.\,H_2O_2/OH^-]{1.\,B_2H_6} \underset{(\text{An isomer of } X)}{C_7H_{14}O(Z)\cdot(Y)}$

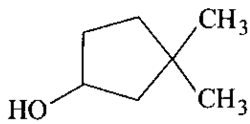
$\xrightarrow[2.\,Zn/H_2O]{1.\,O_3}$ 

Z can be :

(a) 

(b) 

(c) 

(d) 

32. $A \xrightarrow{H_3\overset{\oplus}{O}} Me—\underset{\displaystyle Me}{\underset{|}{CH}}—COOH$

$A \xrightarrow[H_3\overset{\oplus}{O}]{\text{MeMgBr (two equiv.)}} B$ $\quad B$ is :

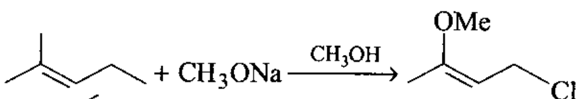
(a) $Me_2CHCOMe$ (b) $Me_2CH—\underset{\displaystyle OH}{\underset{|}{C}}Me_2$

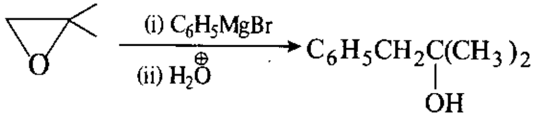
(c) $Me_2CHCOCHMe_2$ (d) $Me_2CH\underset{\displaystyle OH}{\underset{|}{C}}HCHMe_2$

33. Which of the following reactions is possible ?

(a) $C_6H_5OH + HBr \longrightarrow C_6H_5Br + H_2O$

(b) $(CH_3)_3CCl + NaOCH_3 \longrightarrow (CH_3)_3COCH_3 + NaCl$

(c) 

(d) 

34. $H_3C—\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}—CH{=}CH_2 \xrightarrow{X} H_3C—\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}—\underset{\displaystyle OH}{\underset{|}{CH}}—CH_3$. X can be :

(a) $BH_3/THF, H_2O_2/OH^-$ (b) H_3O^+

(c) $Hg(OAc)_2/NaBH_4, NaOH$ (d) All of these

35. $H_2C{=}CH{-}CCl_3 \xrightarrow{Cl_2+H_2O} A$, A is :

(a) $CCl_3\underset{\substack{|\\ OH}}{CH}{-}CH_2Cl$ (b) $CCl_3\underset{\substack{|\\ Cl}}{CH}{-}CH_2OH$

(c) $CCl_3\underset{\substack{|\\ Cl}}{CH}{-}CH_2Cl$ (d) $CCl_3\underset{\substack{|\\ OH}}{CH}{-}\underset{\substack{|\\ OH}}{CH_2}$

36. $CH_3CH{=}CH_2 \xrightarrow[H_2O_2/OH]{NaBD_4}$ Product X, X is :

(a) $CH_3\underset{\substack{|\\ OH}}{C}HCH_2D$ (b) $CH_3\underset{\substack{|\\ D}}{C}HCH_2OH$

(c) $CH_3\underset{\substack{|\\ OD}}{C}HCH_3$ (d) none is correct

37. Identify end products A, B and C of the following :

$$CH_3CH{=}CH_2 \xrightarrow[\text{(ii) } H_2O]{\text{(i) } D^+} A; CH_3CH{=}CH_2 \xrightarrow[\text{(ii) } D_2O]{\text{(i) } H^+} B; CH_3CH{=}CH_2 \xrightarrow[\text{(ii) } D_2O]{\text{(i) } D^+} C$$

(a) $CH_3\underset{\substack{|\\ OH}}{C}HCH_3$ in all cases

(b) $CH_3CH(OH)CH_2D, CH_3CH(OD)CH_3, CH_3CH(OD)CH_2D$

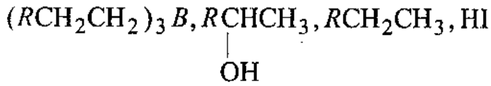
(c) $CH_3\underset{\substack{|\\ OD}}{C}HCH_3$ in all cases

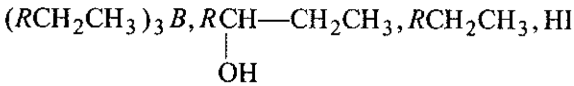
(d) $CH_3\underset{\substack{|\\ OD}}{C}HCH_3D$ in all cases

38.
$$\begin{tikzcd} RCH{=}CH_2 \arrow[r, "BH_3\cdot THF", "CH_2COOH"'] & A \arrow[r, "H_2O_2/OH^-"] \arrow[d] & B \arrow[dl, "D"] \\ & C & \end{tikzcd}$$

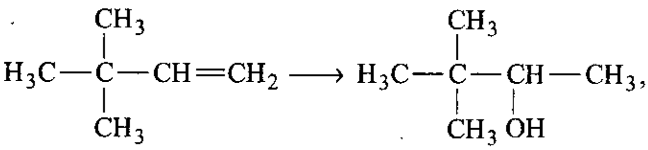
In this sequence of reaction A, B, C and D are respectively :

(a) $(RCH_2CH_2)_3B, RCH_2CH_2OH, RCH_2CH_3, HI$

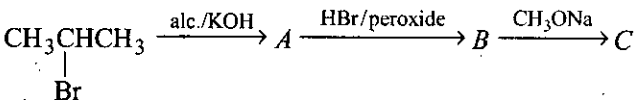
(b) 

(c) 

(d) none of the above

39.  This change can be done by :

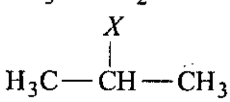
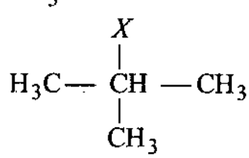
(a) acid catalysed hydration
(b) oxymercuration-demercuration
(c) hydroboration-oxidation
(d) any method mentioned above

40. 

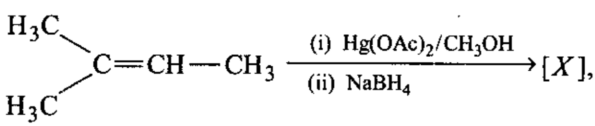
In the above reaction sequence, the final product is :

(a) diethyl ether
(b) 1-methoxypropane
(c) isopropyl alcohol
(d) propylene glycol

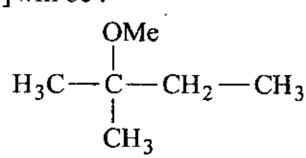
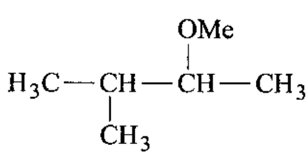
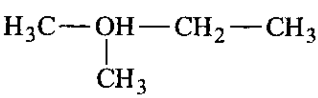
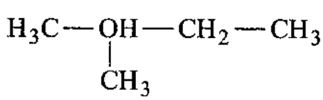
41. Sodium tertiary butoxide forms ether only with :

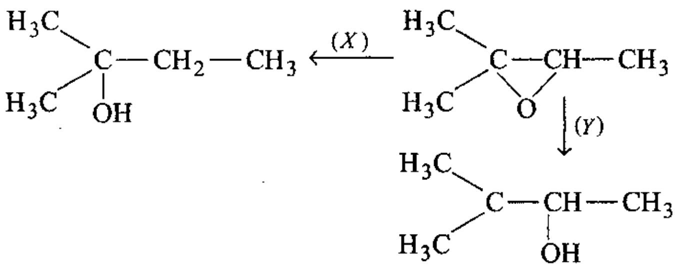
(a) CH_3-CH_2-Br
(b) CH_3-X
(c) 
(d) 

42. In the given reaction



$[X]$ will be :

(a) 
(b) 
(c) 
(d) 

43. 

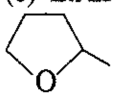
(X) and (Y) are respectively :

(a) $LiAlH_4$ and $NaBH_4$

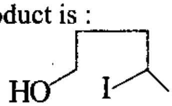
(b) $LiAlH_4/AlCl_3$ and $LiAlH_4$

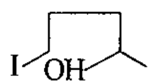
(c) $LiAlH_4$ and $LiAlH_4/AlCl_3$

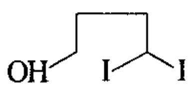
(d) H_2/Ni and H_2/Pt

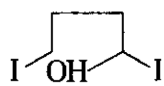
44.  $+ HI \longrightarrow$ Product,

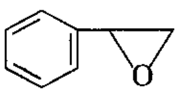
Product is :

(a) 

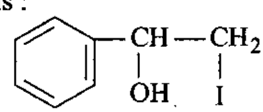
(b) 

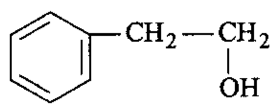
(c) 

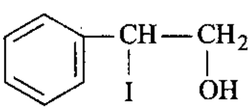
(d) 

45.  $+ HI \longrightarrow (C)$

C is :

(a) 

(b) 

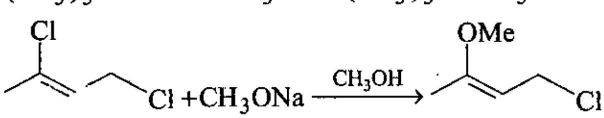
(c) 

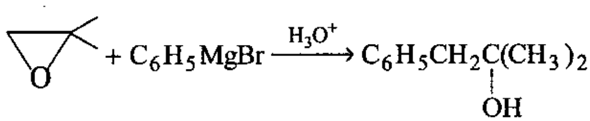
(d) none of these

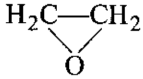
46. Which of the following reaction is possible ?

(a) $C_6H_5OH + HBr \longrightarrow C_6H_5Br + H_2O$

(b) $(CH_3)_3CCl + NaOCH_3 \longrightarrow (CH_3)_3COCH_3 + NaCl$

(c) 

(d) 

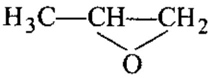
47.  $\xrightarrow[\text{(ii) } H_2O]{\text{(i) } CH_3MgCl} X$. The product obtained in this reaction is :

(a) CH_3CH_2OH
(b) $(CH_3)_2CHOH$
(c) $CH_3CH_2CH_2OH$
(d) $HO-CH_2-CH_2-CH_2-CH_2-OH$

48. What is '*Z*' in the following sequence of reactions ?

$$Z \xrightarrow{PCl_3} X \xrightarrow{\text{alc. KOH}} Y \xrightarrow[\text{(ii) } H_2O \text{ boil}]{\text{(i) Conc. } H_2SO_4} Z$$

(a) $CH_3CH_2CH_2OH$
(b) $CH_3CHOHCH_3$
(c) $(CH_3CH_2)_2CHOH$
(d) $CH_3CH{=}CH_2$

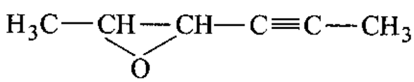
49.  $\xrightarrow[\text{(ii) } CH_3I]{\text{(i) } CH_3{\equiv}C^-}$ Product ?

Product is :

(a) $H_3C-\underset{\substack{|\\ OMe}}{CH}-CH_2-CH{=}CH_2-CH_3$

(b) $H_3C-\underset{\substack{|\\ OMe}}{CH}-CH_2-C{\equiv}C-CH_3$

(c) $H_3C-\underset{\substack{|\\ OH}}{CH}-CH_2-C{\equiv}C-CH_3$

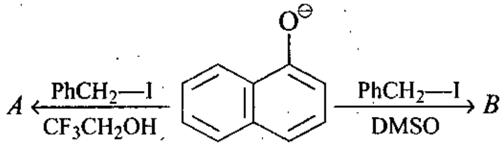
(d) 

50. In the reaction

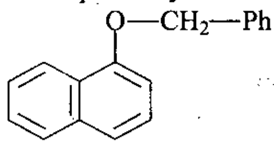
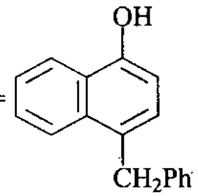
$$2C_2H_5OH \xrightarrow[240°C]{Al_2O_3} (C_2H_5)_2O + H_2O$$

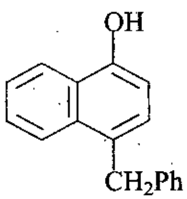
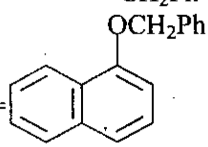
alumina acts mainly as :
(a) an absorbent of water
(b) a provider of hot solid surface
(c) a Lewis acid to coordinate $(C_2H_5)_2O$ formed
(d) a Lewis acid catalyst to increase the leaving group ability of the —OH group by coordination at oxygen

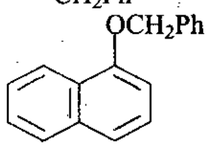
LEVEL-2

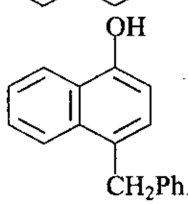
1. 

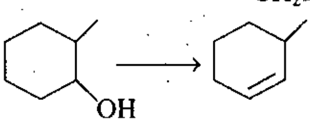
A and B are respectively :

(a) A =  ; B = 

(b) A =  ; B = 

(c) $A = B$ = 

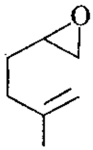
(d) $A = B$ = 

2. 

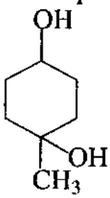
Which of the following is the best set of reagents to perform the above conversion?

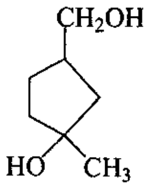
(a) ThO_2, Δ (b) H_3PO_4, Δ

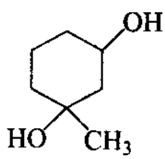
(c) Conc. H_2SO_4 ; Δ (d) Al_2O_3, Δ

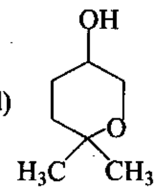
3.  $\xrightarrow{H^{\oplus}/H_2O}$ Product

The main product is :

(a) 

(b) 

(c) 

(d) 

4. $2Ph-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[H_2O]{Mg\text{-}Hg} \xrightarrow[\Delta]{Conc. H_2SO_4} \xrightarrow{KMnO_4, H^{\oplus}}$

The final product is :

(a) $CH_3-\underset{OH}{\overset{Ph}{C}}-\underset{OH}{\overset{Ph}{C}}-CH_3$

(b) $CH_3-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-CH_3$

(c) $Ph-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-Ph$

(d) $CH_3-\underset{Ph}{\overset{Ph}{C}}-\underset{O}{\underset{\|}{C}}-CH_3$

5. $2Ph-\underset{O}{\underset{\|}{C}}-CH_3 \xrightarrow[H_2O]{Mg\text{-}Hg} \xrightarrow{Dil. H_2SO_4}$ Product

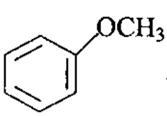
The main product is :

(a) $Ph-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-Ph$

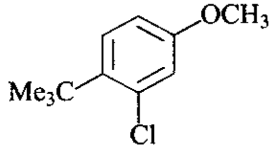
(b) $CH_3-\underset{O}{\underset{\|}{C}}-\underset{O}{\underset{\|}{C}}-CH_3$

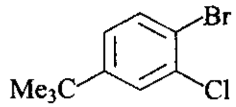
(c) $Ph-\underset{CH_3}{\overset{Ph}{C}}-\underset{O}{\underset{\|}{C}}-CH_3$

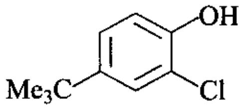
(d) $Ph-\underset{O}{\underset{\|}{C}}-\underset{CH_3}{\overset{Ph}{C}}-CH_3$

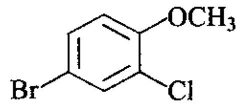
6.  $\xrightarrow[AlCl_3]{Me_3C-Cl} \xrightarrow{Cl_2, FeCl_3} \xrightarrow{HBr, \Delta} A.$

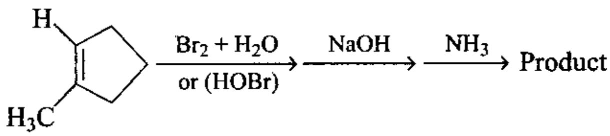
The final product A is :

(a) 

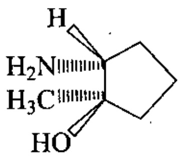
(b) 

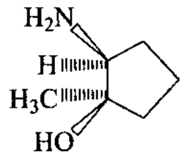
(c) 

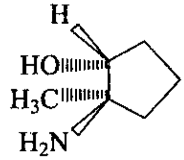
(d) 

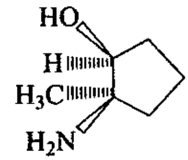
7. 

The product is :

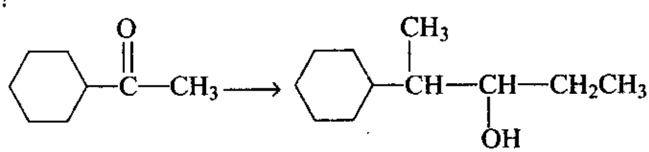
(a) 

(b) 

(c) 

(d) 

8. Which of the following sets of reagents would accomplish the following conversion?



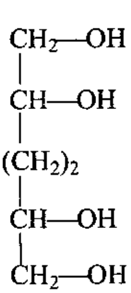
(a) $CH_3CH_2CH_2MgBr$; $H^{\oplus}$ / H_2O, PCC, CH_2Cl_2

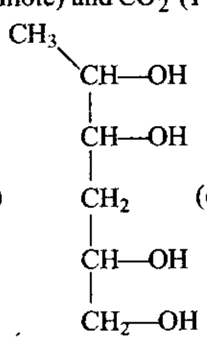
(b) $CH_3CH_2CH_2MgBr$; $H^{\oplus}$ / H_2O ; H_2SO_4, Δ; PCC, CH_2Cl_2

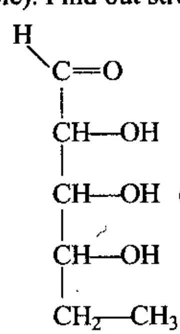
(c) $Ph_3P{=}CHCH_2CH_3$; B_2H_6, H_2O_2, $\overset{\ominus}{O}H$

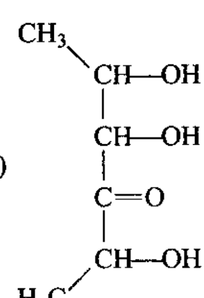
(d) $Ph_3P{=}CHCH_2CH_3$; H_2SO_4, H_2O

9. An organic compound A (Molecular formula $C_6H_{12}O_4$) on treatment with Na metal liberates H_2 gas and on treatment with HIO_4 gives 2 moles of CH_3CHO, HCOOH (1 mole) and CO_2 (1 mole). Find out structure of A.

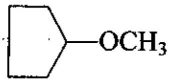
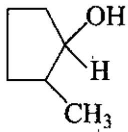
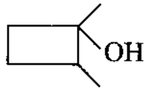
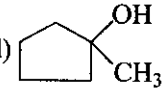
(a) 

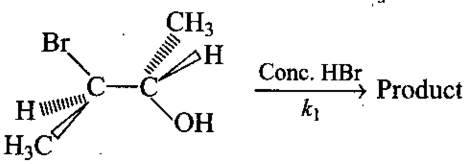
(b) 

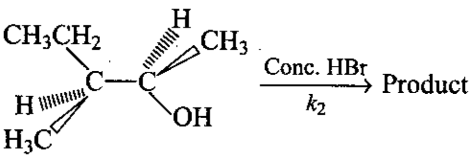
(c) 

(d) 

10. An organic compound A (Molecular formula $C_6H_{12}O$) does not change the colour of acidic dichromate solution. Compound A on treatment with H_2SO_4 produces alkene, which on oxidative ozonolysis gives a molecule ($C_6H_{10}O_3$) which gives positive iodoform test. Find out structure of 'A'.

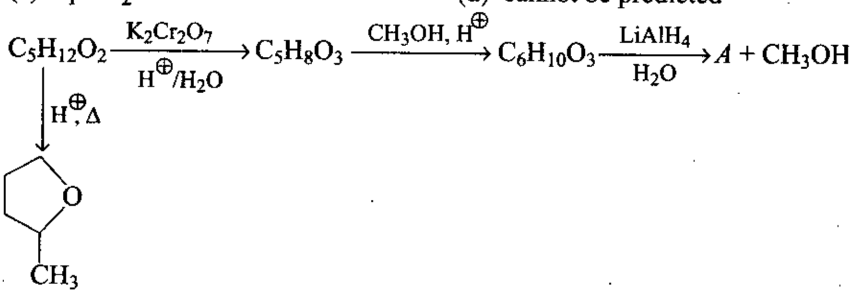
(a)  (b)  (c)  (d) 

11. 

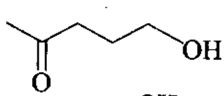
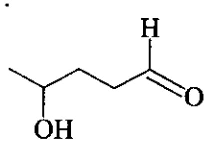


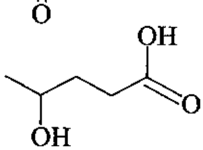
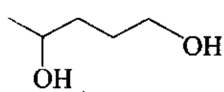
—OH group is substituted by —Br. The slowest step is dehydration. Which of the following is correct comparison of rate constants k_1 and k_2?

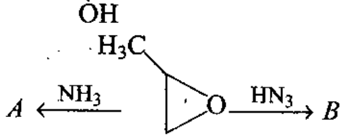
(a) $k_1 = k_2$ (b) $k_1 > k_2$
(c) $k_1 < k_2$ (d) cannot be predicted

12. 

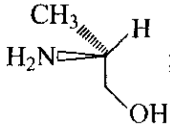
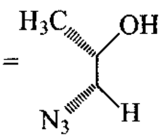
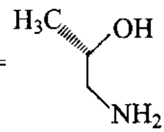
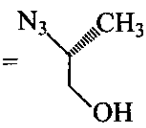
The molecule A in the sequence reaction is :

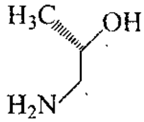
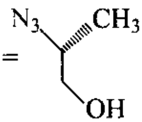
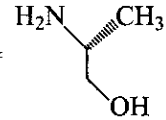
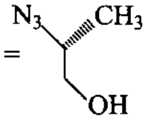
(a)  (b) 

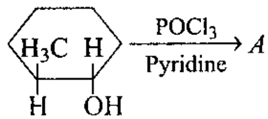
(c)  (d) 

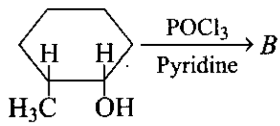
13. 

The products A and B are respectively :

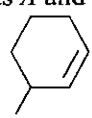
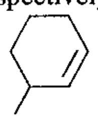
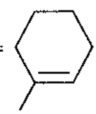
(a) $A =$  ; $B =$  (b) $A =$  ; $B =$ 

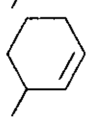
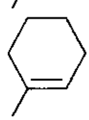
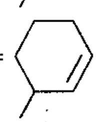
(c) $A =$  ; $B =$  (d) $A =$  ; $B =$ 

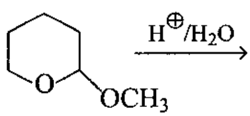
14. 

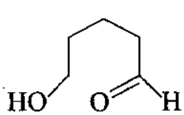
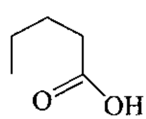
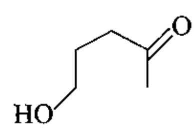


Products A and B are respectively :

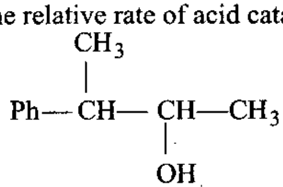
(a) $A =$  ; $B =$  (b) $A = B =$ 

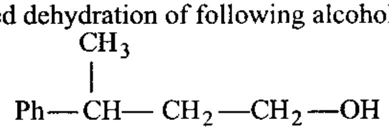
(c) $A =$  ; $B =$  (d) $A = B =$ 

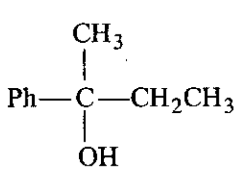
15. 

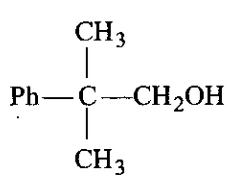
(a)  (b) CH_3CH_2—OH (c)  (d) 

16. The relative rate of acid catalysed dehydration of following alcohols would be :


(P)


(Q)


(R)


(S)

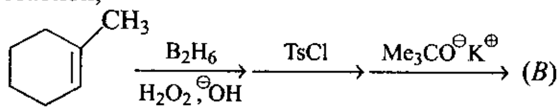
(a) $R > P > S > Q$ (b) $R > S > P > Q$ (c) $P > R > S > Q$ (d) $R > S > Q > P$

17. Which of the following alcohols will show positive iodoform test?

(a) $CH_3-\underset{}{CH}(OH)-CH_2-NO_2$ (b) $CH_3-CH(OH)-CH_2-\overset{O}{\overset{\|}{C}}-OH$

(c) $ICH_2-CH(OH)-CH_2CH_3$ (d) None of these

18. In the given reaction,

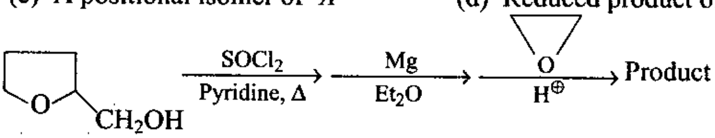


(A)

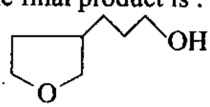
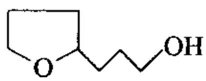
The product B is :

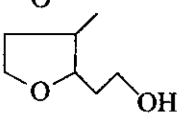
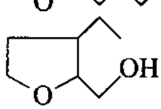
(a) Identical to B (b) Chain isomer of A

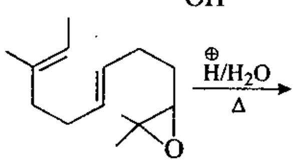
(c) A positional isomer of 'A' (d) Reduced product of A

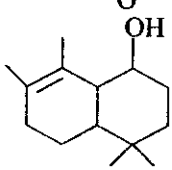
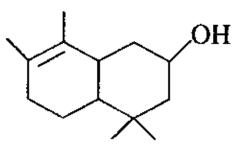
19. 

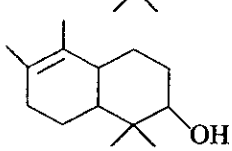
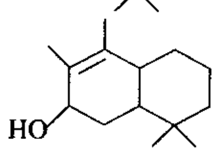
The final product is :

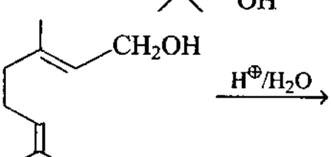
(a)  (b) 

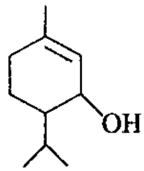
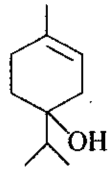
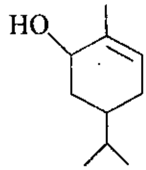
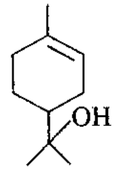
(c)  (d) 

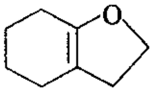
20. 

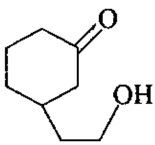
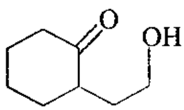
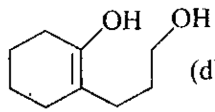
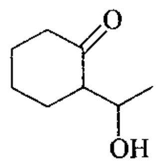
(a)  (b) 

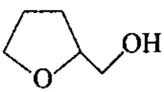
(c)  (d) 

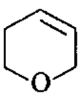
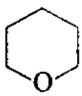
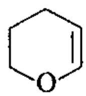
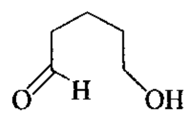
21. 

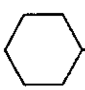
(a)  (b)  (c)  (d) 

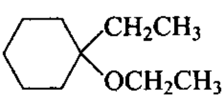
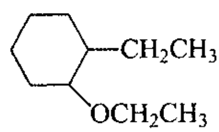
22.  $\xrightarrow[H_2O]{H^{\oplus}}$

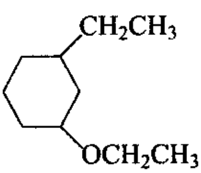
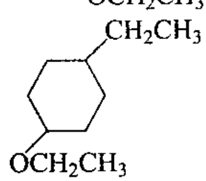
(a)  (b)  (c)  (d) 

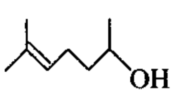
23.  $\xrightarrow{H^{\oplus}}$

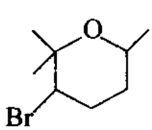
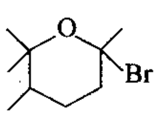
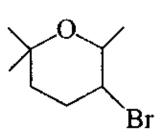
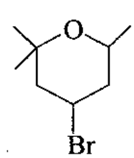
(a)  (b)  (c)  (d) 

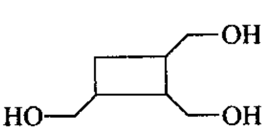
24.  $-CH{=}CH_2 \xrightarrow[H_2SO_4]{CH_3CH_2OH}$

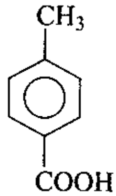
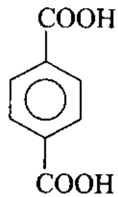
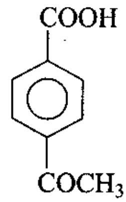
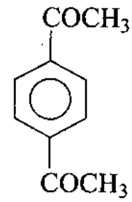
(a)  (b) 

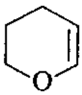
(c)  (d) 

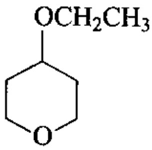
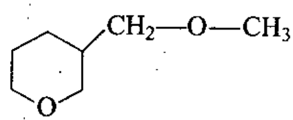
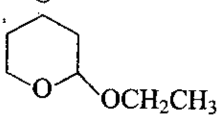
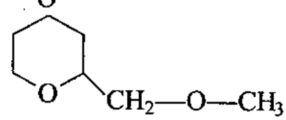
25.  $\xrightarrow[CH_3NO_2]{Br_2}$

(a)  (b)  (c)  (d) 

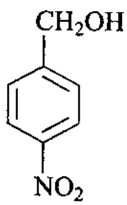
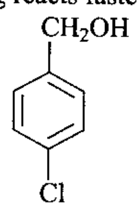
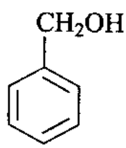
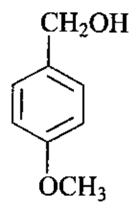
26.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4} A \xrightarrow[AlCl_3]{(CH_3CO)_2O} B \xrightarrow[\Delta]{KMnO_4/\overset{\ominus}{O}H} C$

(a) 
(b) 
(c) 
(d) 

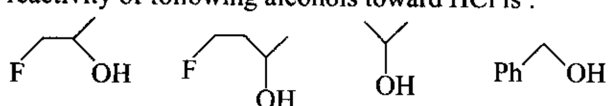
27.  $+ CH_3CH_2OH \xrightarrow{HCl}$

(a) 
(b) 
(c) 
(d) 

28. Which of the following reacts fastest with HBr?

(a) 
(b) 
(c) 
(d) 

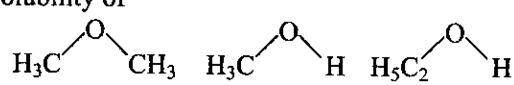
29. The order of reactivity of following alcohols toward HCl is :



1 2 3 4

(a) $1 > 2 > 3 > 4$
(b) $1 > 3 > 2 > 4$
(c) $4 > 3 > 2 > 1$
(d) $4 > 3 > 1 > 2$

30. The order of solubility of

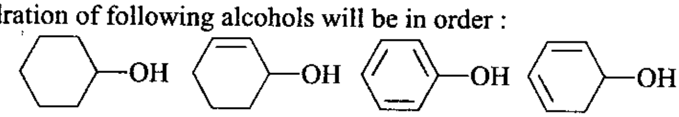


I II III

in water is :

(a) I > II > III
(b) I < II < III
(c) II > III > I
(d) II > I > III

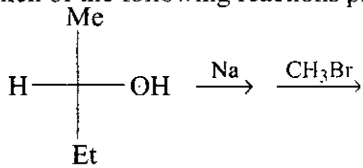
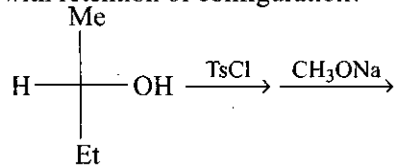
31. Dehydration of following alcohols will be in order :

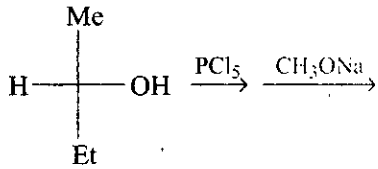
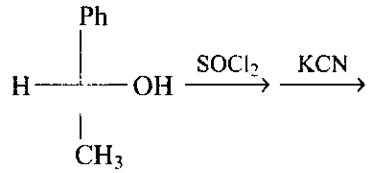


1 2 3 4

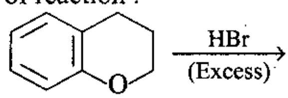
(a) $1 < 2 < 3 < 4$
(b) $4 > 3 > 1 > 2$
(c) $4 > 2 > 1 > 3$
(d) $1 > 3 > 4 > 2$

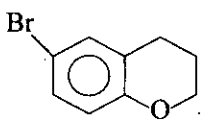
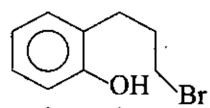
32. Which of the following reactions proceeds with retention of configuration?

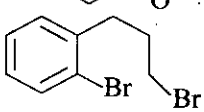
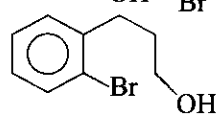
(a)  (b) 

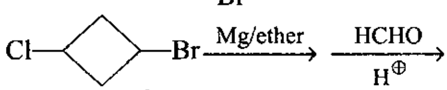
(c)  (d) 

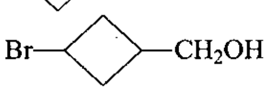
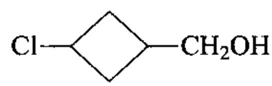
33. Find out correct product of reaction :

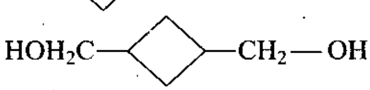
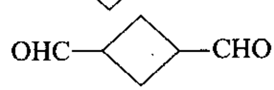


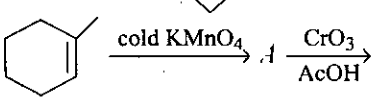
(a)  (b) 

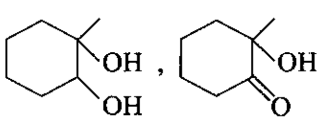
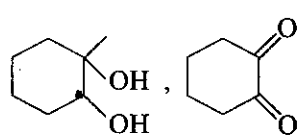
(c)  (d) 

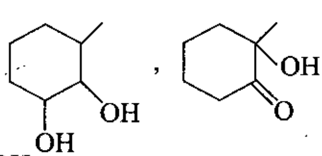
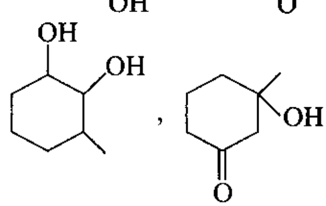
34.  A, A is :

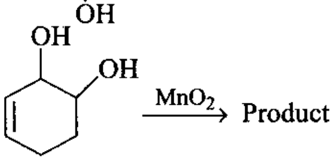
(a)  (b) 

(c)  (d) 

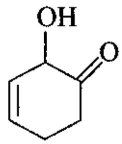
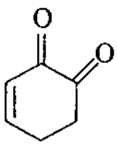
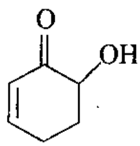
35.  B, A and B are :

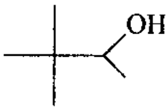
(a)  (b) 

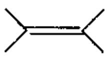
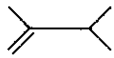
(c)  (d) 

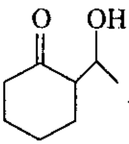
36. 

The main product is :

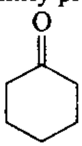
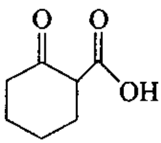
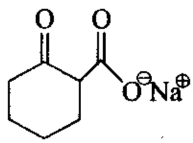
(a)  (b)  (c)  (d) 

37.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$ Major product :

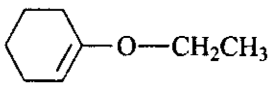
(a)  (b)  (c)  (d) None of these

38.  $\xrightarrow{I_2 + NaOH} A + B \xrightarrow{H^{\oplus}} C \xrightarrow{\Delta} D$

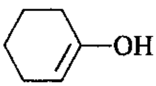
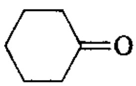
Identify product D in this reaction :

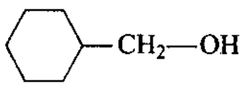
(a)  (b)  (c) CHI_3 (d) 

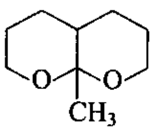
39. In the given reaction

 $\xrightarrow{H^{\oplus}/H_2O} (P)$

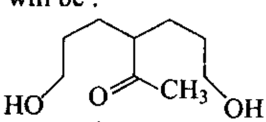
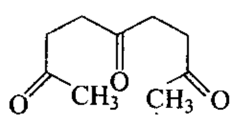
P will be :

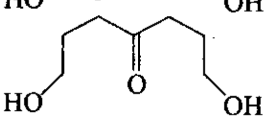
(a)  (b) 

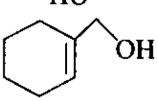
(c)  (d) 

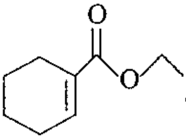
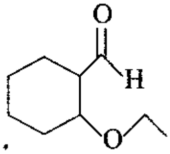
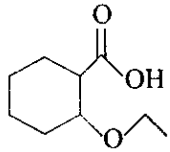
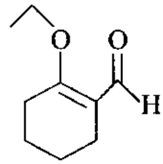
40.  $\xrightarrow{H_2O/H^{\oplus}}$ 'X'

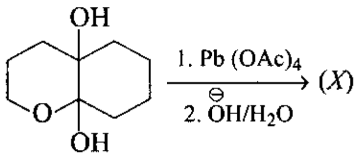
'X' will be :

(a)  (b) 

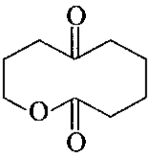
(c)  (d) All of these

41.  $\xrightarrow{MnO_2} \xrightarrow[CH_3CH_2OH]{CH_3CH_2OK}$ Major Product :

(a)  (b)  (c)  (d) 

42. 

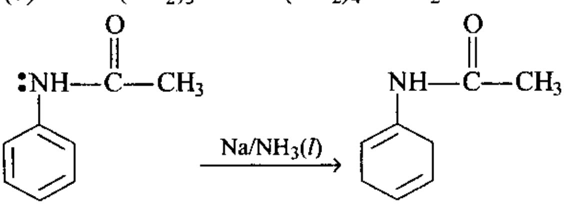
(X) will be :

(a) 

(b) $\overset{\ominus}{O}-\overset{\overset{\displaystyle O}{\|}}{C}-(CH_2)_3-\overset{\overset{\displaystyle O}{\|}}{C}-(CH_2)_4-COOH$

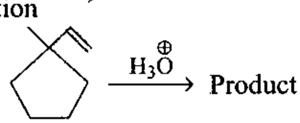
(c) $HO-(CH_2)_3-\overset{\overset{\displaystyle O}{\|}}{C}-(CH_2)_4-\overset{\overset{\displaystyle O}{\|}}{C}-OH$

(d) $HO-(CH_2)_3-\overset{\overset{\displaystyle O}{\|}}{C}-(CH_2)_4-CH_2OH$

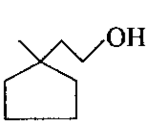
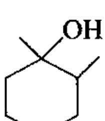
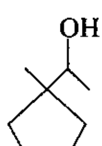
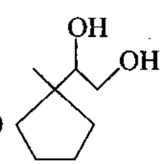
43. 

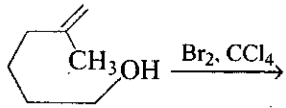
The above reaction is known as :
(a) Clemmensen reduction
(b) Birch reduction
(c) MPV reaction
(d) Wolff-Kishner reaction

44. In the following reaction

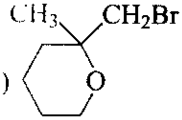
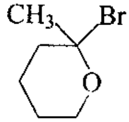
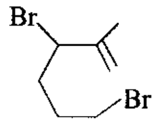
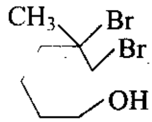


The major product is :

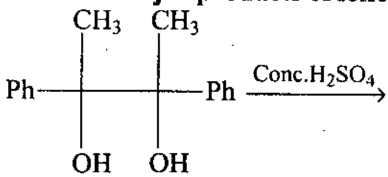
(a)  (b)  (c)  (d) 

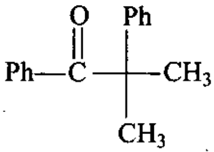
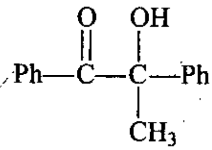
45. 

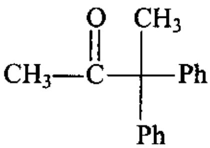
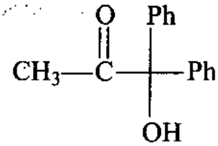
The major product obtained in this reaction is :

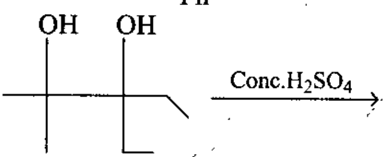
(a)  (b)  (c)  (d) 

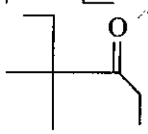
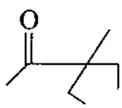
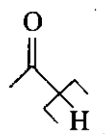
⇒ **Find out major products of following reactions. (Question No. 46-50)**

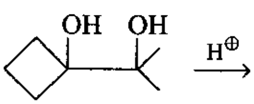
46. 

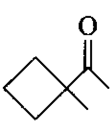
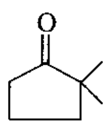
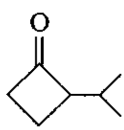
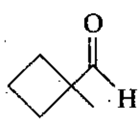
(a)  (b) 

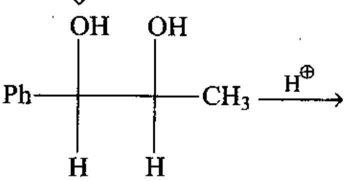
(c)  (d) 

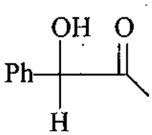
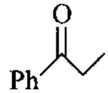
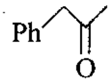
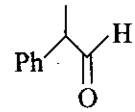
47. 

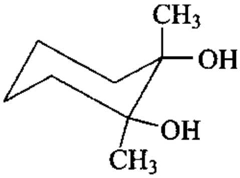
(a)  (b)  (c)  (d) None of these

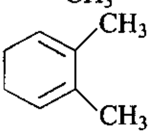
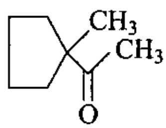
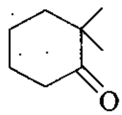
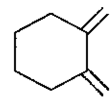
48. 

(a)  (b)  (c)  (d) 

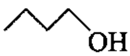
49. 

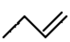
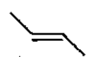
(a)  (b)  (c)  (d) 

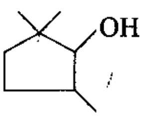
50.  $\xrightarrow{H_2SO_4}$

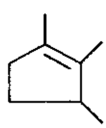
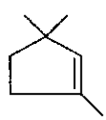
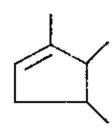
(a)  (b)  (c)  (d) 

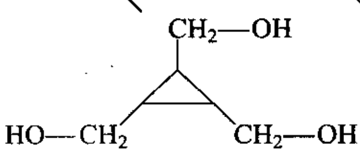
⇒ **Find out major products of following reactions. (Question No. 51-55)**

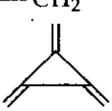
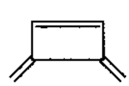
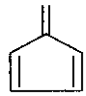
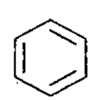
51.  $\xrightarrow[\Delta]{\text{Conc. } H_3PO_4}$

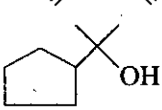
(a)  (b)  (c)  (d) None of these

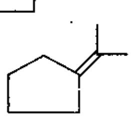
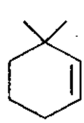
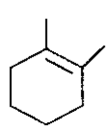
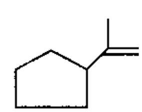
52.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$

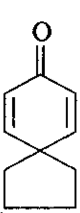
(a)  (b)  (c)  (d) 

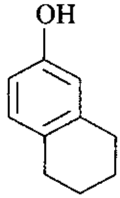
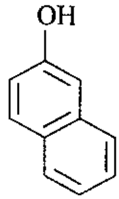
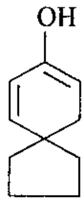
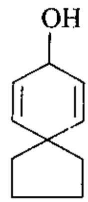
53.  $\xrightarrow{H^{\oplus}, \Delta}$

(a)  (b)  (c)  (d) 

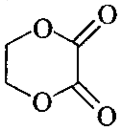
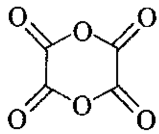
54.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$

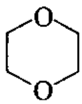
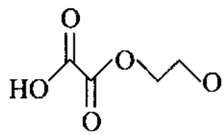
(a)  (b)  (c)  (d) 

55.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$

(a)  (b)  (c)  (d) 

56. When ethylene glycol is heated with oxalic acid in the presence of conc. H_2SO_4, the product formed is :

(a)  (b) 

(c)  (d) 

57. An organic compound having molecular formula C_3H_6O does not react with 2, 4-dinitrophenyl hydrazine and does not react with Na metal. The compound is expected to be :

(a) CH_3CH_2CHO (b) CH_3COCH_3

(c) $CH_2{=}CH{-}CH_2{-}OH$ (d) $CH_2{=}CH{-}O{-}CH_3$

58. Which of the following statements is correct?

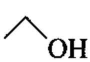
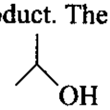
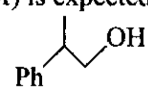
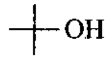
(a) Phenol is less acidic than ethanol

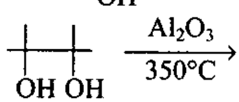
(b) Phenol is more acidic than ethanol

(c) Phenol is more acidic than *p*-nitrophenol

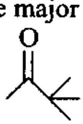
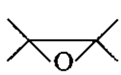
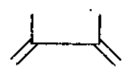
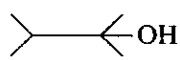
(d) Phenol is more acidic than acetic acid

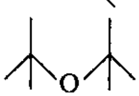
59. The vapours of an alcohol (X) are passed over Cu heated at 300°C whereby an alkene is formed as product. The alcohol (X) is expected to be :

(a)  (b)  (c)  (d) 

60. 

The major product formed in the reaction is :

(a)  (b)  (c)  (d) 

61.  is prepared best by the reaction :

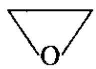
(a) $(CH_3)_3C{-}Br + (CH_3)_3COK \longrightarrow$

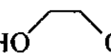
(b) $(CH_3)_3C{-}OH \xrightarrow[140°C]{H_2SO_4}$

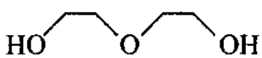
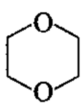
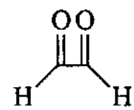
(c) $(CH_3)_3C-OH \xrightarrow[240°C]{Al_2O_3}$

(d) $(CH_3)_2C{=}CH_2 \xrightarrow{\text{Conc. } H_2SO_4} \xrightarrow{(CH_3)_3COH}$

62. When 2-chloroethanol is warmed slightly with dilute NaOH, the major product formed is :

(a) $Cl-CH_2-CH_2-O-CH_2-CH_2-Cl$
(b) $HO-CH_2-CH_2-CH_2-CH_2-OH$
(c) $HO-CH_2-CH_2-OH$
(d) 

63. Ethylene glycol () on heating with conc. H_2SO_4 gives mainly :

(a) 
(b) 
(c) 
(d) 

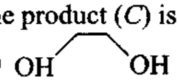
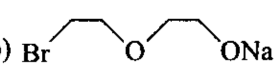
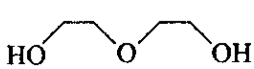
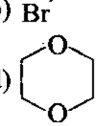
64. Which of the following reactions would give the best yield of *t*-butyl methyl ether?

(a) $(CH_3)_3C-OH \xrightarrow[140°C]{H_2SO_4}$
(b) $(CH_3)_3C-Br + CH_3OH \longrightarrow$
(c) $(CH_3)_3C-Br + CH_3\overset{\ominus}{O}Na^{\oplus} \longrightarrow$
(d) $(CH_3)_3C-\overset{\ominus}{O}\overset{\oplus}{K} + CH_3Br \longrightarrow$

65. Consider the following reactions

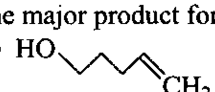
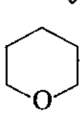
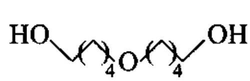
$$\underset{Br}{\underset{|}{CH_2}}-\underset{Br}{\underset{|}{CH_2}} \xrightarrow[H_2O,\,\Delta]{NaOH} A \xrightarrow{NaH} B \;;\; B + \underset{Br}{\underset{|}{CH_2}}-\underset{Br}{\underset{|}{CH_2}} \longrightarrow C$$

The product (*C*) is :

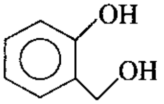
(a) 
(b) 
(c) 
(d) 

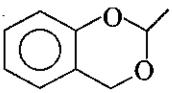
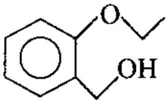
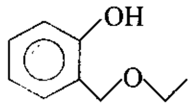
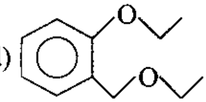
66. In the reaction  $\xrightarrow[\Delta]{H_2SO_4}$

The major product formed is :

(a) 
(b) 
(c) 
(d) 

67. The major product formed in the reaction is :

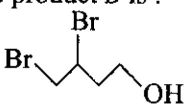
 $+ CH_3CH_2—I \xrightarrow[\text{acetone, } \Delta]{Na_2CO_3}$

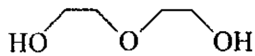
(a)  (b)  (c)  (d) 

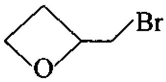
68. Consider the following reaction,

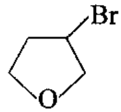
$$H_2C=CH—CH_2CH_2—OH \xrightarrow{Br_2 / CCl_4} A \xrightarrow[25°C]{\text{Dil. KOH}} B$$

The product B is :

(a) 

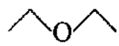
(b) 

(c) 

(d) 

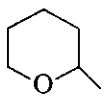
69. Find out correct product of following reaction :

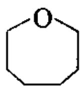
$$CH_3CH_2Br \xrightarrow[\Delta]{Ag_2O, \text{ dry}}$$

(a)  (b) $CH_2=CH_2$ (c)  (d) CH_3CH_2OH

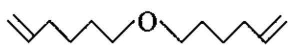
70. The major product (X) of the reaction :

 $\xrightarrow[H_2O]{H_2SO_4}$ 'X'

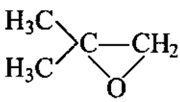
(a) 

(b) 

(c) 

(d) 

71. In the reaction,

 $\xrightarrow[H^{\oplus}]{CH_3OH} (X)$

The product (X) has the structure :

(a) $H_3C—C(CH_3)(OCH_3)—CH_2OH$

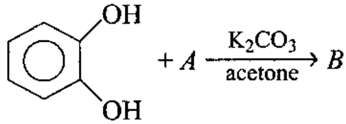
(b) $H_3C—C(CH_3)(OH)—CH_2—OCH_3$

(c) $H_3C—C(CH_3)(OCH_3)—CH_3$

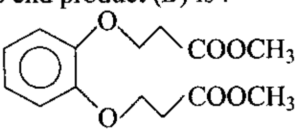
(d) $CH_3—CH(CH_3)—CH_2—OCH_3$

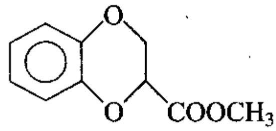
72. Consider the following sequence of reactions

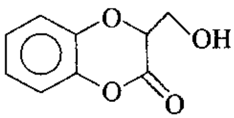
$$H_2C{=}CH{-}COOCH_3 + Br_2 \xrightarrow{CCl_4} A$$

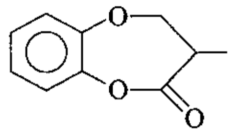


The end product (B) is :

(a) 

(b) 

(c) 

(d) 

73. In the reaction :

$$Me_3C{-}O{-}CH_2CH_3 + \underset{(1\ \text{Mole})}{HI} \xrightarrow{\Delta}$$

(a) $Me_3C{-}OH + CH_3CH_2I$

(b) $Me_3C{-}I + CH_3CH_2OH$

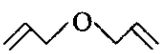
(c) $Me_3C{-}I + CH_3CH_2I$

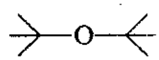
(d) $Me_3C{-}OH + CH_3CH_2OH$

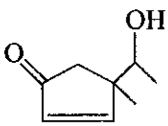
74. Which of the following ethers is the most unreactive to cleavage with conc. HBr?

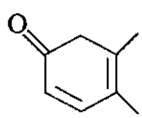
(a) $Ph{-}CH_2{-}O{-}CH_3$

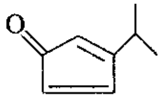
(b) $Ph{-}O{-}Ph$

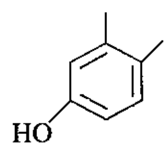
(c) 

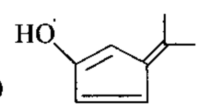
(d) 

75.  $\xrightarrow{H^{\oplus}}$ Major product :

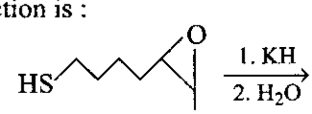
(a) 

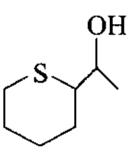
(b) 

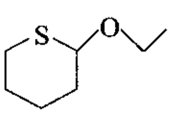
(c) 

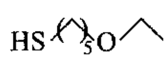
(d) 

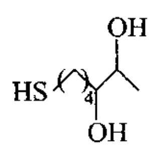
76. The product of the reaction is :



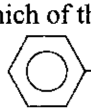
(a) 

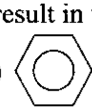
(b) 

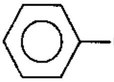
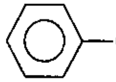
(c) 

(d) 

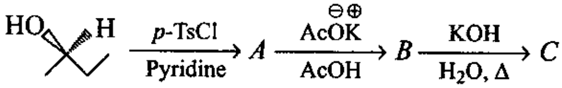
77. Which of the following reactions will not result in the formation of anisole?

(a)  $-OH + (CH_3)_2SO_4 \xrightarrow{NaOH}$

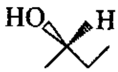
(b)  $-OH + CH_3I \longrightarrow$

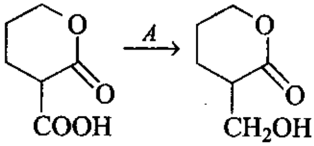
(c) —OH + $CH_2N_2 \longrightarrow$ (d) —OH + $CH_3MgI \longrightarrow$

78. Consider the following sequence of reactions.

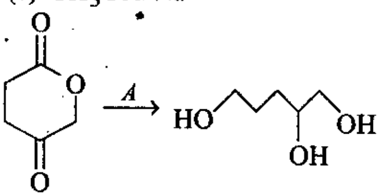


The major product (C) is :

(a)  (b)  (c)  (d) (±)-2-butanol

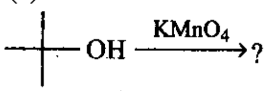
79.  ; A is :

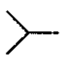
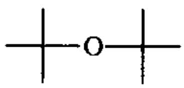
(a) B_2H_6/H_2O (b) $LiAlH_4$
(c) CH_3OH/Na (d) P/HI

80. 

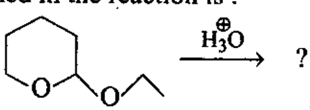
Reagent A used in this change is :

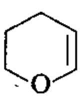
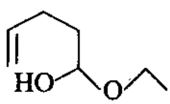
(a) B_2H_6 (b) $LiAlH_4$
(c) Sn/HCl (d) $NaBH_4$

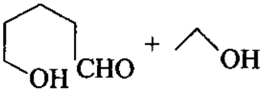
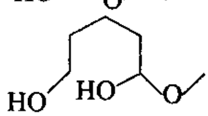
81. 

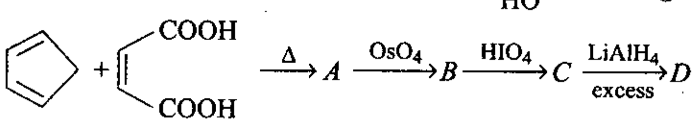
(a)  (b)  (c)  (d) No reaction

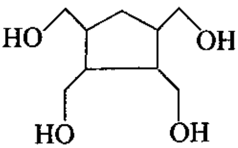
82. The major product formed in the reaction is :

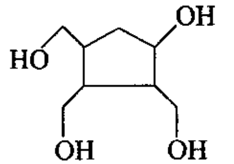


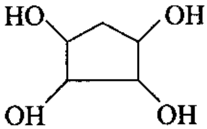
(a)  + CH_3CH_2OH (b) 

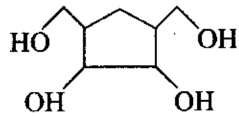
(c)  (d) 

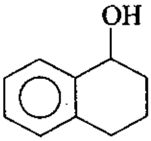
83. 

(a) 

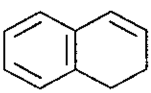
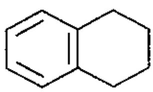
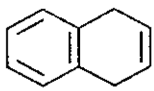
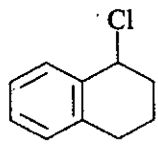
(b) 

(c) 

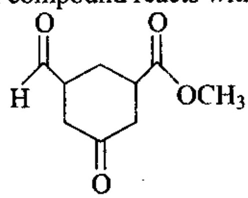
(d) 

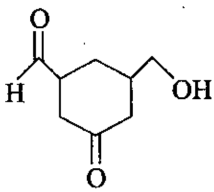
84.  $\xrightarrow[\text{Pyridine}]{\text{TsCl}} A \xrightarrow{\text{LiAlH}_4} B$

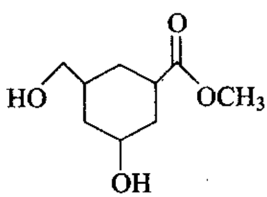
Product (B) of the above reaction is :

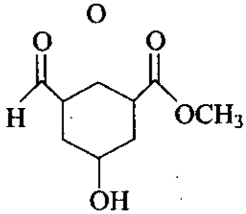
(a)  (b)  (c)  (d) 

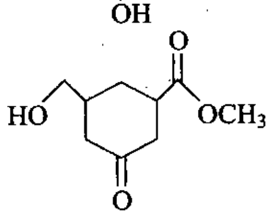
85. Find out the product when compound reacts with $NaBH_4$:

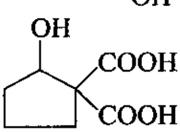


(a) 

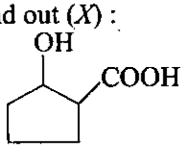
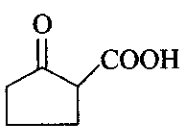
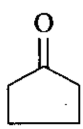
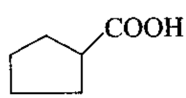
(b) 

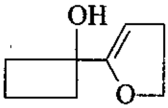
(c) 

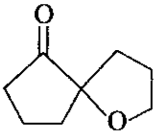
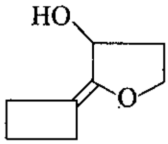
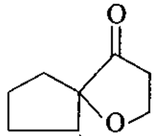
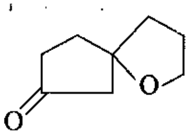
(d) 

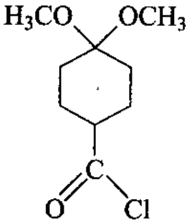
86.  $\xrightarrow[\Delta]{K_2Cr_2O_7} (X)$

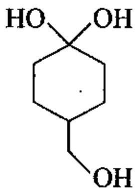
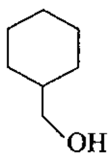
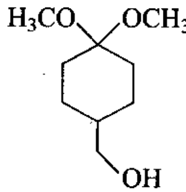
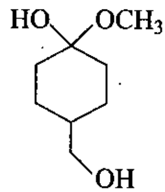
Find out (X) :

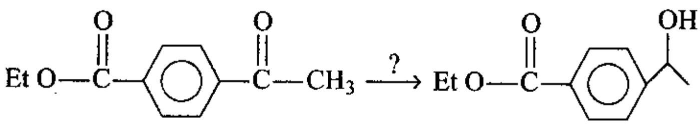
(a)  (b)  (c)  (d) 

87.  $\xrightarrow{H^{\oplus}}$ Product

(a)  (b)  (c)  (d) 

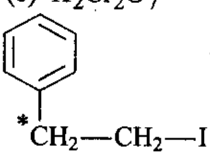
88.  $\xrightarrow{NaBH_4}$ (X), Product (X) is :

(a)  (b)  (c)  (d) 

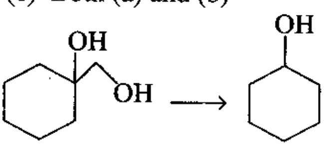
89. 

Which of the following reagents will be used for above conversions?

(a) $LiAlH_4$ (b) $NaBH_4$
(c) $K_2Cr_2O_7$ (d) Jones reagent

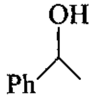
90.  $\xrightarrow{KSH}$; Product of the reaction is :

(a) $Ph-\overset{*}{C}H_2-CH_2-SH$ (b) $Ph-CH_2-\overset{*}{C}H_2-SH$
(c) Both (a) and (b) (d) None of these

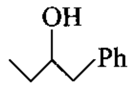
91.  ; This conversion can be carried out by :

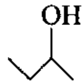
(a) H_2SO_4/Δ, HIO_4
(b) $NaIO_4$, $H^{\oplus}/\Delta$
(c) HIO_4, $NaBH_4$
(d) $H^{\oplus}/\Delta$, Zn(Hg – HCl)

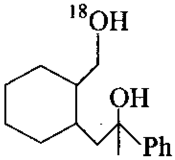
92. Which of the following alcohols will not give iodoform test?

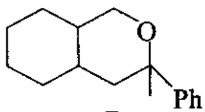
(a) 

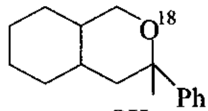
(b) $CH_3—CH_2—OH$

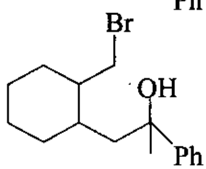
(c) 

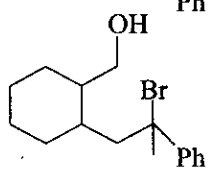
(d) 

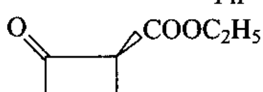
93.  $\xrightarrow[CCl_4]{HBr}$ Major product obtained in this reaction is :

(a) 

(b) 

(c) 

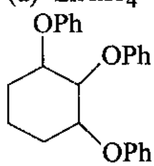
(d) 

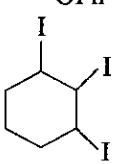
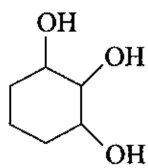
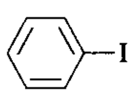
94.  $\xrightarrow{LiAlH_4}$; Products of the reaction is :

(a) racemic
(b) diastereomers
(c) meso
(d) optically pure

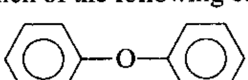
95. Reduction of $R—CH_2OH \longrightarrow RCH_3$ can be carried out by :

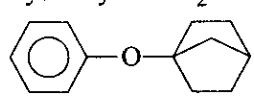
(a) $LiAlH_4$ (b) $H_2—Ni$ (c) Red P + HI (d) $NaBH_4/AlCl_3$

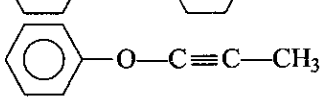
96.  $\xrightarrow{\text{HI (excess)}}$; which of the following is major product?

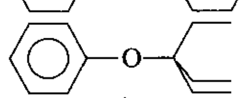
(a)  (b)  (c)  (d) None of these

97. Which of the following ethers will get hydrolysed by $H^{\oplus}/H_2O$?

(a) 

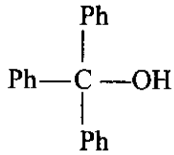
(b) 

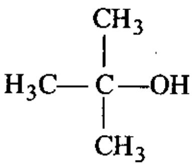
(c) 

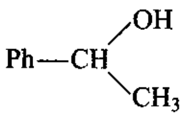
(d) 

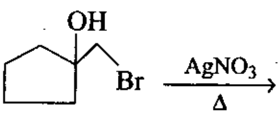
98. Which of the following alcohols will not react with Cu/Δ?

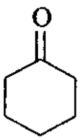
(a) $CH_3—CH_2—OH$

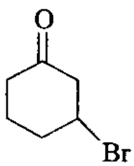
(b) 

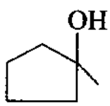
(c) 

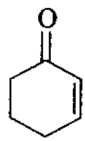
(d) 

99.  'Y'; 'Y' is :

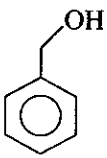
(a) 

(b) 

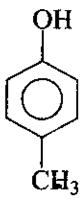
(c) 

(d) 

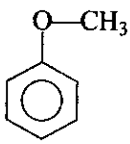
100. Which of the following can give purple colour with neutral $FeCl_3$?



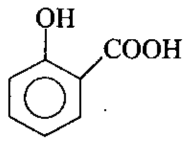
(i)



(ii)

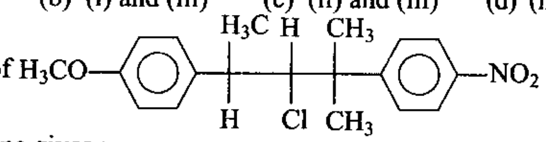


(iii)



(iv)

(a) (ii) and (iv) (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) and (iv)

101. The hydrolysis of 

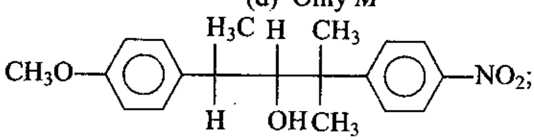
in aqueous acetone gives :

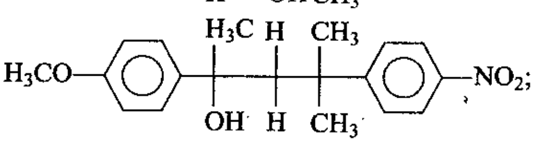
(a) *K* and *L*

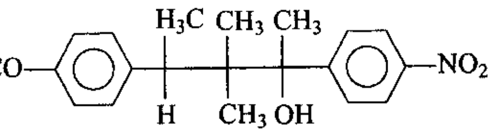
(b) Only *K*

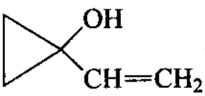
(c) *L* and *M*

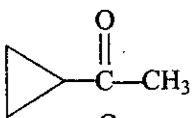
(d) Only *M*

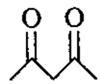
where *K* = 

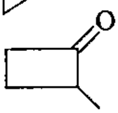
L = 

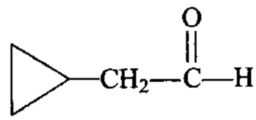
$M =$ 

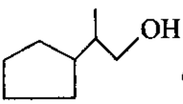
102.  $\xrightarrow{H_2SO_4}$ '*P*'; Identify '*P*' in the reaction :

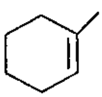
(a) 

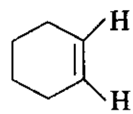
(b) 

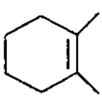
(c) 

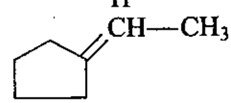
(d) 

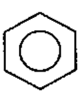
103.  on dehydration gives :

(a) 

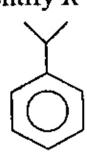
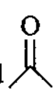
(b) 

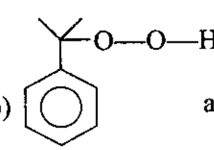
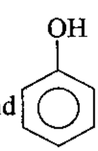
(c) 

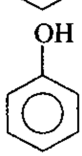
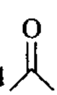
(d) 

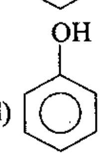
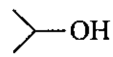
104.  $+ CH_3{-}CH{=}CH_2 \xrightarrow{H_2SO_4} P \xrightarrow[h\nu]{O_2} Q \xrightarrow{H^{\oplus}/H_2O} R + S$

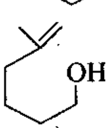
Identify *R* and *S* :

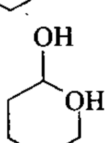
(a)  and 

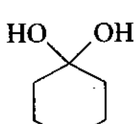
(b)  and 

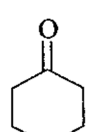
(c)  and 

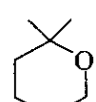
(d)  and 

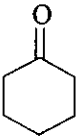
105.  $\xrightarrow[NaBH_4]{Hg(OAc)_2,\ H_2O/H^{\oplus}}$ '*X*'; '*X*' is :

(a) 

(b) 

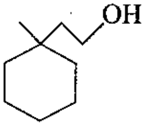
(c) 

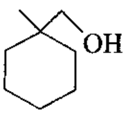
(d) 

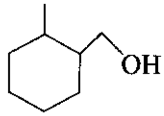
106. 

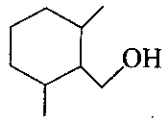
$+ CH_3MgBr \xrightarrow{H^{\oplus}/H_2O} P \xrightarrow{HBr} Q \xrightarrow[\text{Ether}]{Mg} R \xrightarrow[H^{\oplus}/H_2O]{HCHO} S,$

S is :

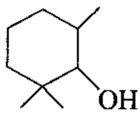
(a) 

(b) 

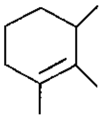
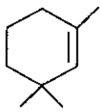
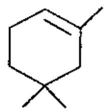
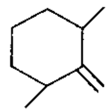
(c) 

(d) 

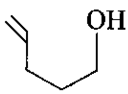
107. Identify the major product of the following reaction :

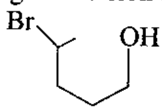


$\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$

(a) 
(b) 
(c) 
(d) 

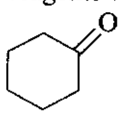
108. Find the correct method for the following conversion :

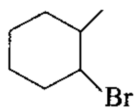


$\longrightarrow$


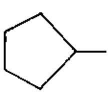
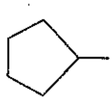
(a) $\overset{\ominus}{O}H$, HBr
(b) Conc. H_2SO_4, Δ
(c) $H^{\oplus}$, HBr
(d) None of these

109. Which combination of reagents will bring about the following conversion?



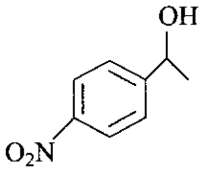
$\longrightarrow$


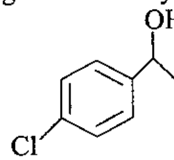
(a) $MeMgBr/H^{\oplus}, H_2SO_4/\Delta, HBr/H_2O_2$
(b) $MeMgBr/H^{\oplus}, H_2SO_4/\Delta, HBr$
(c) $MeMgBr/H^{\oplus}, HBr/CCl_4$
(d) $HBr/H_2O_2, MeMgBr/H^{\oplus}$

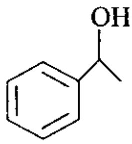
110.  CH_2OH is converted into  $\underset{\text{OH}}{CH}—CH_2—CH_3$ by :

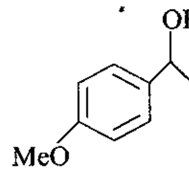
(a) $Cu/\Delta, CH_3CH_2MgCl/H_3O^{\oplus}$
(b) $CrO_3, CH_3CH_2MgCl/H_3O^{\oplus}$
(c) $KMnO_4, CH_3CH_2MgCl/H_3O^{\oplus}$
(d) $Na_2Cr_2O_7/H^{\oplus}, CH_3CH_2MgCl/H_3O^{\oplus}$

111. Which of the following alcohols will undergo easiest dehydration?

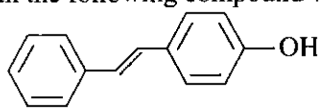
(a) 

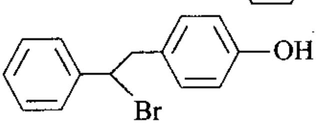
(b) 

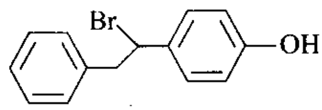
(c) 

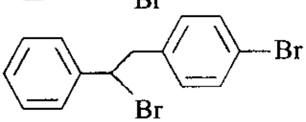
(d) 

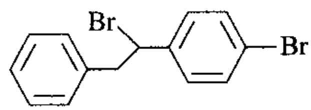
112. The reaction of HBr with the following compound would produce :



(a) 

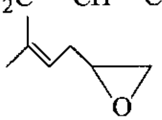
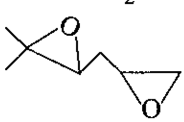
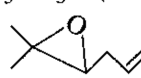
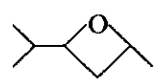
(b) 

(c) 

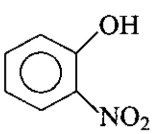
(d) 

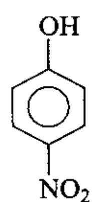
113. In the following reactions

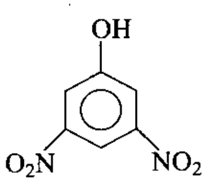
$Me_2C{=}CH{-}CH_2{-}CH{=}CH_2 + C_6H_5CO_3H\,(1\,\text{equiv.}) \longrightarrow X$, X is :

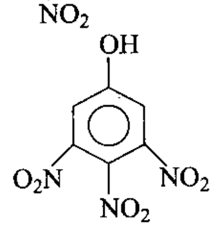
(a) 
(b) 
(c) 
(d) 

114. The most steam volatile species is :

(a) 

(b) 

(c) 

(d) 

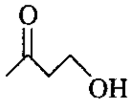
115. In the Libermann nitroso reaction, changes in the colour of phenol occur as :

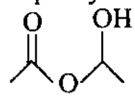
(a) Brown or red-green-red-deep blue
(b) Red-deep blue-green
(c) Red-brown-white
(d) White-red-green

116. The alcohol which is most readily dehydrated is :

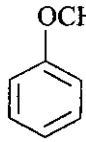
(a) 2-butanol

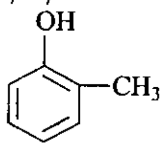
(b) 1-phenyl-1-propanol

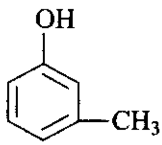
(c) 

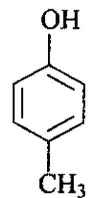
(d) 

117. A compound P (C_7H_8O) is insoluble in water, dilute HCl, $NaHCO_3$ but dissolve in dilute NaOH. When P is treated with bromine-water, it is converted into a compound of formula C_7H_7OBr. Compound P is :

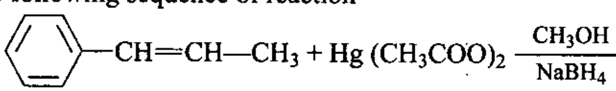
(a) 

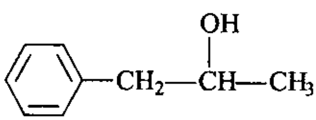
(b) 

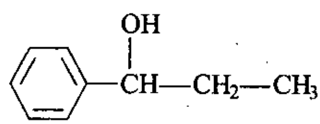
(c) 

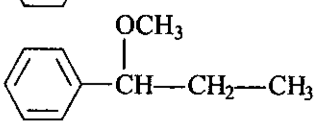
(d) 

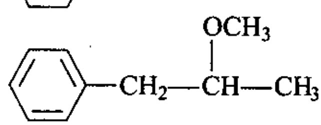
118. In the following sequence of reaction

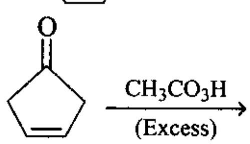
 X, X is :

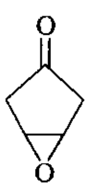
(a) 

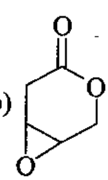
(b) 

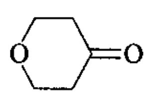
(c) 

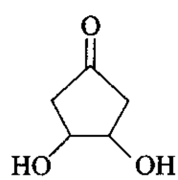
(d) 

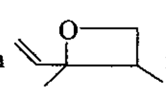
119.  ; Product of the reaction is :

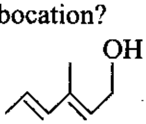
(a) 

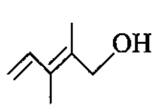
(b) 

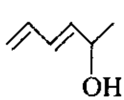
(c) 

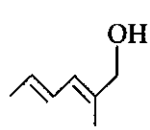
(d) 

120. When  is treated with proton acid, a resonance stabilized cation is produced. Which diene listed below when treated with acid will give the same carbocation?

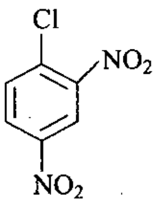
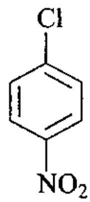
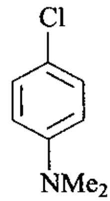
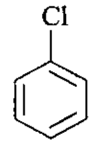
(a) 

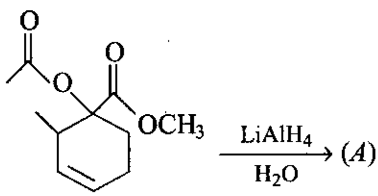
(b) 

(c) 

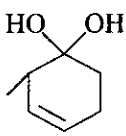
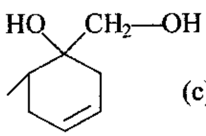
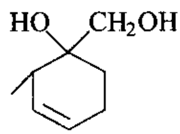
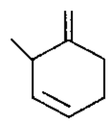
(d) 

121. Which of the following would undergo most rapid hydrolysis with aqueous NaOH to furnish the corresponding hydroxy derivatives?

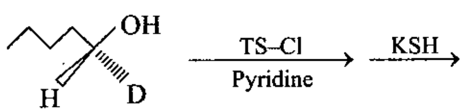
(a) 
(b) 
(c) 
(d) 

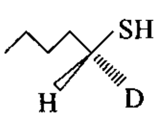
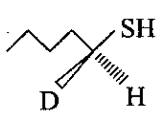
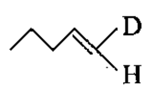
122. 

Find out '*A*' of the reaction :

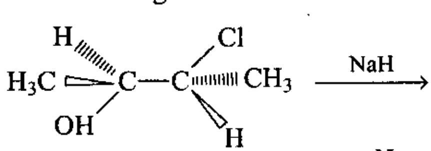
(a) 
(b) 
(c) 
(d) 

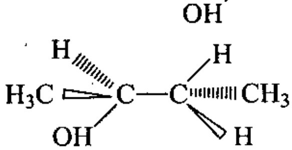
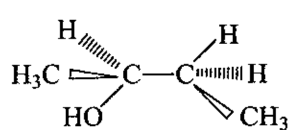
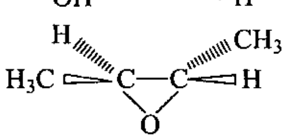
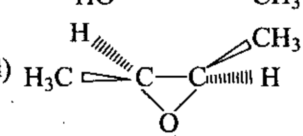
123. Identify the major product of reaction :



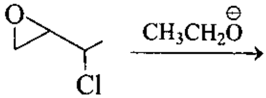
(a) 
(b) 
(c) 
(d) No reaction

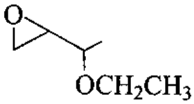
124. Find the product of following reaction with stereochemistry.

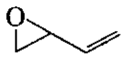


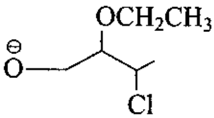
(a) 
(b) 
(c) 
(d) 

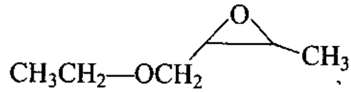
125. Select the major product of following reaction :



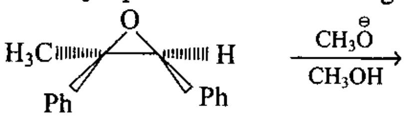
(a) 

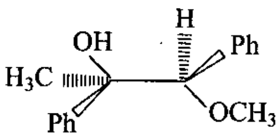
(b) 

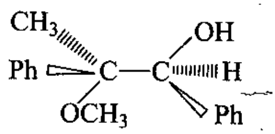
(c) 

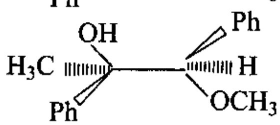
(d) 

126. What would be the major product of the following reaction?



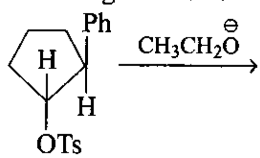
(a) 

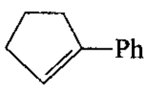
(b) 

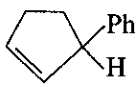
(c) 

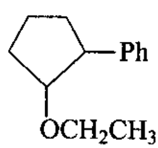
(d) None of these

127. Find out major product of following reaction :

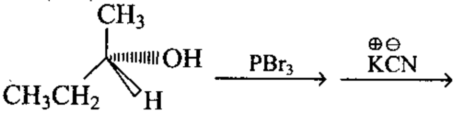


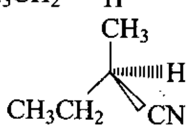
(a) 

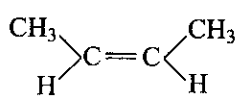
(b) 

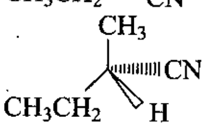
(c) 

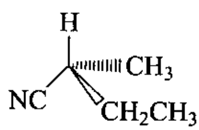
(d) No reaction

128.  final product.

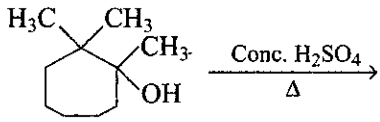
(a) 

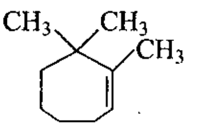
(b) 

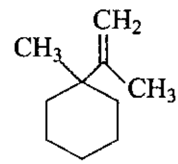
(c) 

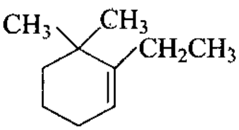
(d) 

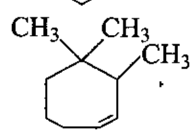
129. What would be the major product of following reaction?

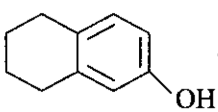


(a) 

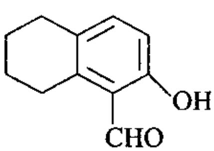
(b) 

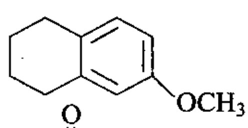
(c) 

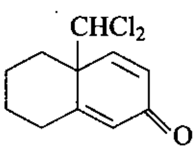
(d) 

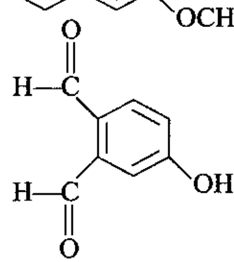
130.  $\xrightarrow{CHCl_3 + NaOH}$ $\underset{\text{(Expected)}}{A}$ + $\underset{\text{(Unexpected)}}{B}$

The unexpected product *B* is :

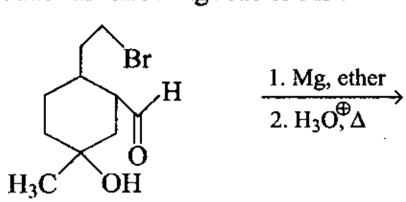
(a) 

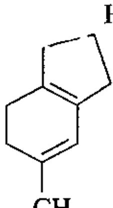
(b) 

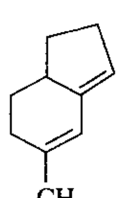
(c) 

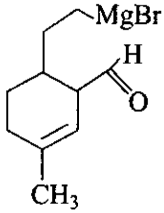
(d) 

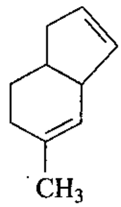
131. The final product in following reaction is :



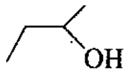
(a) 

(b) 

(c) 

(d) 

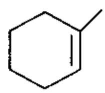
132. How many structure of final products are possible?

 $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$ $\xrightarrow{Br_2/CCl_4}$ $C_4H_8Br_2$

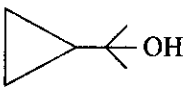
(a) 2 (b) 5 (c) 6 (d) 3

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

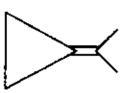
1. Choose incorrect statements regarding the following reaction :

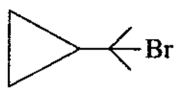
 $\xrightarrow[^{\ominus}OH,\ H_2O_2]{B_2H_6}$

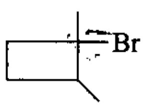
(a) *Syn* addition of —H (from BH_3) and —OH (from solution) occur.
(b) *Syn* addition of —H (from BH_3) and —OH (from H_2O_2) occur.
(c) The product is optically active.
(d) Addition follows anti-Markownikoff orientation.

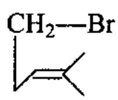
2.  $\xrightarrow{HBr}$ Product

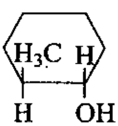
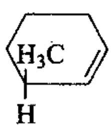
Which of the following are possible products in significant amounts?

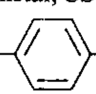
(a) 

(b) 

(c) 

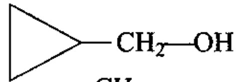
(d) 

3.  $\longrightarrow$ 

Which of the following represent conditions to perform given conversion?
(a) $POCl_3$, pyridine
(b) Na - metal, CS_2, heat
(c) H_3C——SO_2Cl, pyridine; $CH_3CH_2O^{\ominus}/CH_3CH_2OH$
(d) CF_3SO_2Cl, pyridine ; $Me_3CO^{\ominus}K^{\oplus}$

4. Which of the following alcohols do not give white turbidity on treatment with $HCl / ZnCl_2$?

(a) CH_3CH_2OH

(b) 

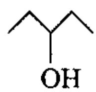
(c) $N\equiv C-CH(CH_3)-OH$

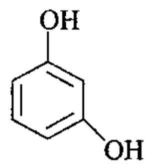
(d) $CH_3-C(CH_3)_2-OH$

5. Which of the following will give iodoform?

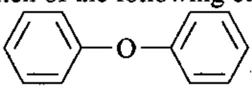
(a) CH_3CH_2OH

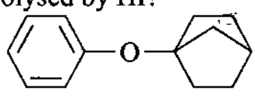
(b) $CH_3-CH(OH)-Ph$

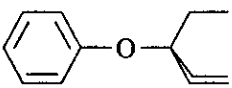
(c) 

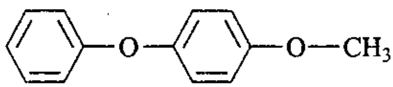
(d) 

6. Which of the following ethers will get hydrolysed by HI?

(a) 

(b) 

(c) 

(d) 

7. Which of the following reactions are correctly matched?

(a) $CH_3-C(CH_3)_2-O-CH_3 \xrightarrow{HI} S_N1$

(b) $CH_3-CH(CH_3)-O-CH_3 \xrightarrow{H^{\oplus}/H_2O} S_N1$

(c) $CH_3-CH(CH_3)-O-CH_3 \xrightarrow{HI} S_N2$

(d) $CH_3-O-CH_2CH_3 \xrightarrow{HI} S_N1$

8. Which of the following compounds will give positive Victor Meyer test?

(a) CH_3CH_2OH

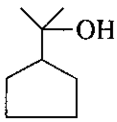
(b) $CH_3-C(CH_3)_2-OH$

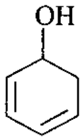
(c) $CH_3CH_2—I$

(d) $CH_3—\underset{}{\overset{\displaystyle CH_3}{\overset{|}{C}H}}—NO_2$

9. Which of the following alcohols undergo rearrangement during dehydration reaction?

(a) $CH_3—\overset{\displaystyle CH_3}{\overset{|}{\underset{\underset{\displaystyle CH_3}{|}}{C}}}—\underset{\underset{\displaystyle OH}{|}}{CH}—CH_3$

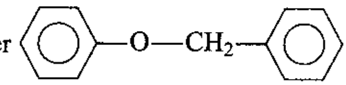
(b) 

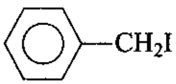
(c) 

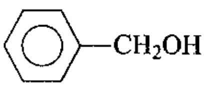
(d) $Ph—\overset{\displaystyle CH_3}{\overset{|}{C}H}—\underset{\underset{\displaystyle OH}{|}}{CH}—CH_3$

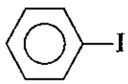
10. $C_2H_5OC_2H_5$ and OH can be distinguished by :

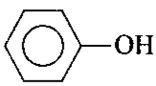
(a) aq. $FeCl_3$
(b) Na metal
(c) Tollen's reagent
(d) $K_2Cr_2O_7$

11. The ether  when treated with HI produces :

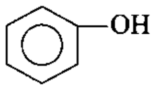
(a) 

(b) 

(c) 

(d) 

12. Which of the following reactions will give ether as main product?

(a)  $\xrightarrow[C_2H_5Br]{Na}$

(b) $Me_3C—OH \xrightarrow[C_6H_5Br]{Na}$

(c) $Me_3C—OH \xrightarrow[CH_3CH_2CH_2Br]{Na}$

(d) $CH_3CH_2CH_2OH \xrightarrow[Me_3C—Br]{Na}$

13. C_2H_5Br can be converted into $C_2H_5—O—C_2H_5$ by :

(a) reacting by C_2H_5ONa
(b) heating with moist Ag_2O
(c) heating with dry Ag_2O
(d) treating with C_2H_5MgBr

14. $1°, 2°$ and $3°$ alcohols can be distinguished by :

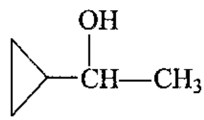
(a) Cu/573 K
(b) Victor Meyer test
(c) $ZnCl_2/HCl$
(d) $Br_2 + H_2O$

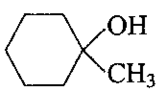
15. Alcohols can be replaced by —Cl group by the following reagents :

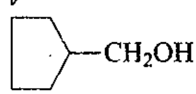
(a) Cl_2
(b) $SOCl_2$
(c) PCl_5
(d) $HCl + ZnCl_2$

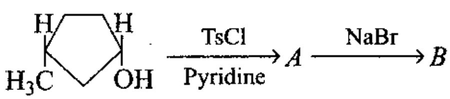
16. Glycerol can be converted to acrolein by dehydration in presence of :
(a) Conc. H_2SO_4 (b) $KHSO_4$ (c) $CaCl_2$ (d) Anhyd. $ZnCl_2$

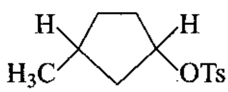
17. $CH_3CH_2—OH$ can be converted to CH_3CH_2CN by the following reactions :
(a) $CH_3CH_2OH + KCN \xrightarrow{\Delta}$ (b) $CH_3CH_2OH + HCN \xrightarrow{\Delta}$
(c) $CH_3CH_2OH \xrightarrow{TsCl} \xrightarrow{KCN}$ (d) $CH_3CH_2OH \xrightarrow{SOCl_2} \xrightarrow{KCN}$

18. Which of the following will oxidise to salt of acid by Br_2 + KOH?
(a) $CH_3—CH_2—OH$ (b) 

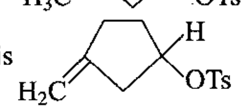
(c) 

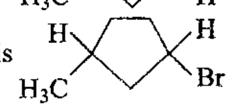
(d) 

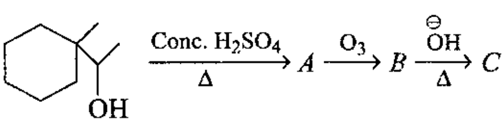
19. 

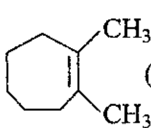
(a) A is 

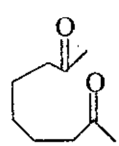
(b) B is 

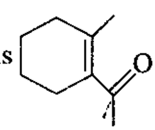
(c) A is 

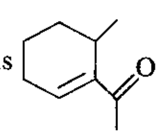
(d) B is 

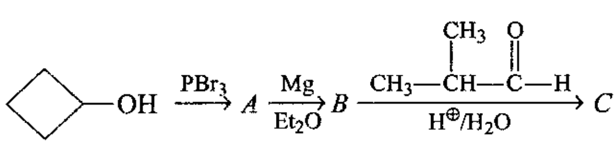
20. 

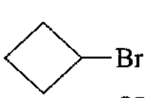
(a) A is 

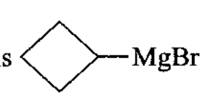
(b) B is 

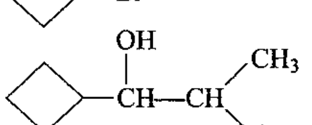
(c) C is 

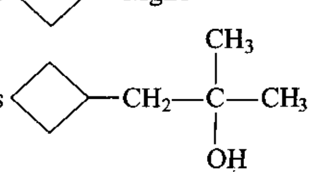
(d) C is 

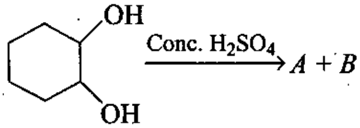
21. 

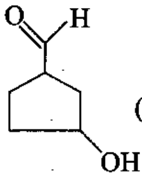
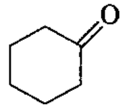
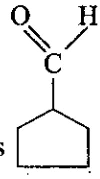
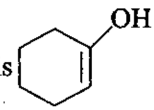
(a) A is 

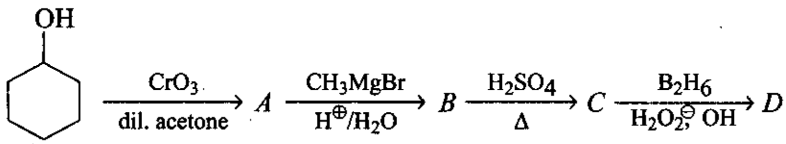
(b) B is 

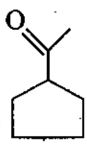
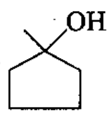
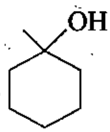
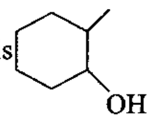
(c) C is 

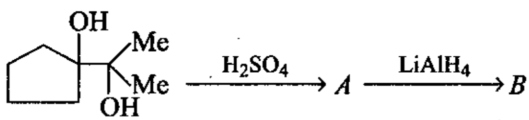
(d) C is 

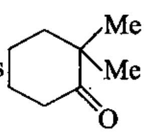
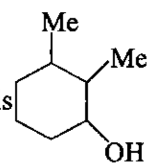
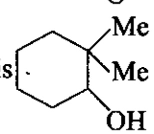
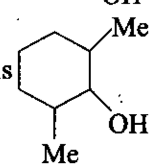
22. 

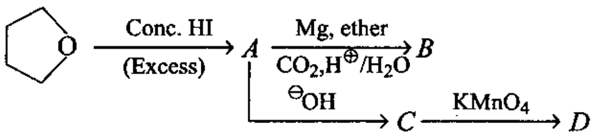
(a) A is 
(b) A is 
(c) B is 
(d) B is 

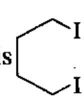
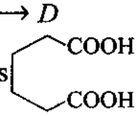
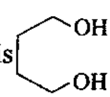
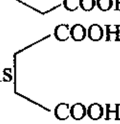
23. 

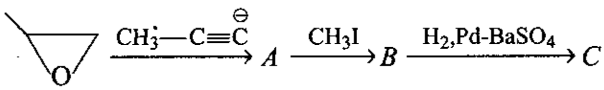
(a) A is 
(b) B is 
(c) C is 
(d) D is 

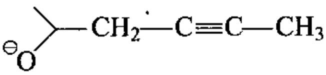
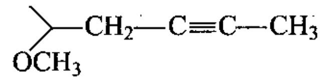
24. 

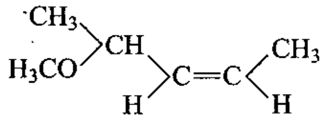
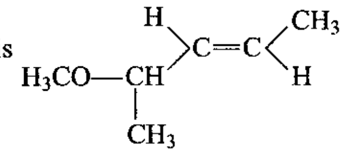
(a) A is 
(b) A is 
(c) B is 
(d) B is 

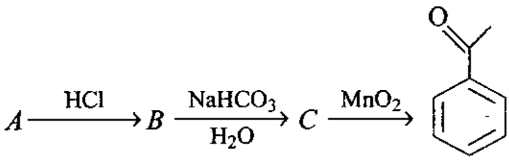
25. 

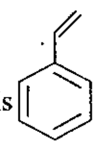
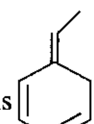
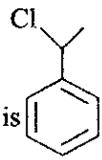
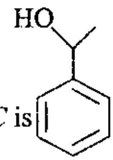
(a) A is 
(b) B is 
(c) C is 
(d) D is 

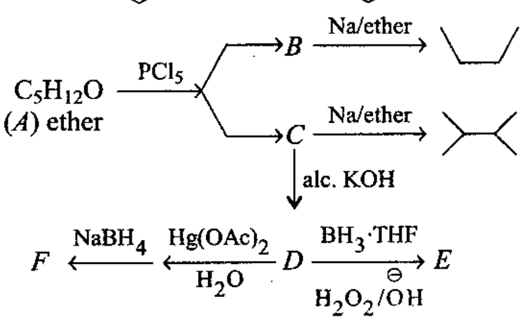
26. 

(a) A is  (b) B is 

(c) C is  (d) C is 

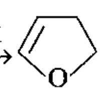
27. 

(a) A is  (b) A is  (c) B is  (d) C is 

28. 

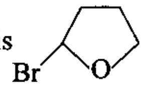
(a) D is $CH_3{-}CH{=}CH_2$ (b) E is $CH_3{-}CH_2{-}CH_2{-}OH$

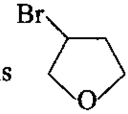
(c) F is $CH_3{-}\underset{\displaystyle OH}{\underset{|}{CH}}{-}CH_3$ (d) B is CH_3CH_2Cl

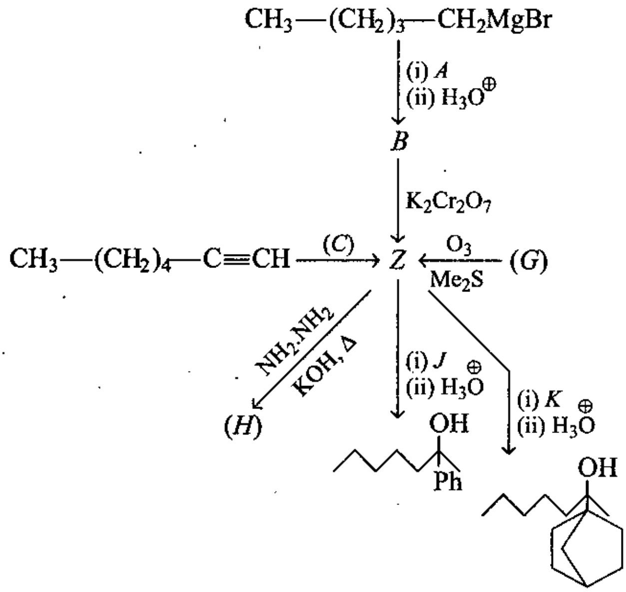
29. $H_2C{=}CH{-}CH_2Br \xrightarrow[\text{2. HCHO}\ \ \text{3. } H_3\overset{\oplus}{O}]{\text{1. Mg}} A \xrightarrow{Br_2} B \xrightarrow{KOH} C \xrightarrow{\text{alc. KOH}}$ 

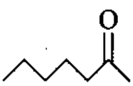
(a) A is $H_2C{=}CH{-}CH_2CH_2OH$

(b) B is $\overset{\displaystyle Br}{\overset{|}{CH_2}}{-}\underset{\displaystyle Br}{\underset{|}{CH}}{-}CH_2{-}CH_2{-}OH$

(c) C is 

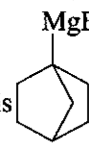
(d) C is 

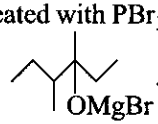
30. 

(a) Z is 

(b) J is PhMgBr

(c) C is Hg^{2+}/H_2SO_4

(d) K is 

31. Compound A is an optically active alcohol. Treatment with oxidising agent converts it to a ketone B. In a separate reaction A is treated with PBr_3, converting it into C. C on reaction with Mg is added to B to yield . Identify the correct options.

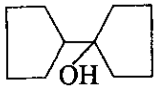
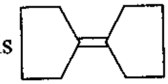
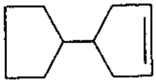
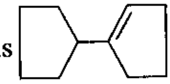
(a) A is 2-butanol

(b) A is 1-butanol

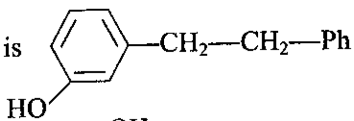
(c) C is 2-bromobutane

(d) C is 1-bromobutane

32. Alcohol A ($C_{10}H_{18}O$) is converted into mixture of alkene B and C on heating with conc. H_3PO_4. Catalytic hydrogenation of B and C yields the same product. Assuming that dehydration of alcohol A proceed without rearrangement. Alkene B on ozonolysis form cyclopentanone. Identify the correct options.

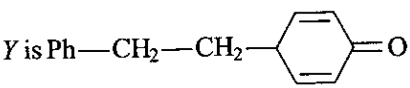
(a) A is 
(b) B is 
(c) C is 
(d) C is 

33. A compound 'X' ($C_{14}H_{14}O$) on mild oxidation yields $C_{14}H_{12}O$ (Y). If X is treated with a dehydrating agent, it loses a molecule of H_2O and resulting product on vigorous oxidation yield two molecule of benzoic acid. Identify the structure of X and Y.

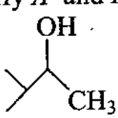
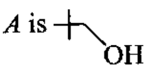
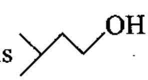
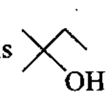
(a) X is 

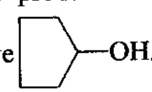
(b) X is $Ph-\overset{\overset{OH}{|}}{C}H-CH_2-Ph$

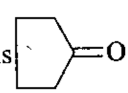
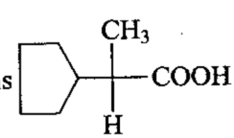
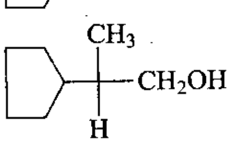
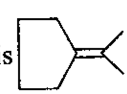
(c) Y is $Ph-\overset{\overset{O}{\|}}{C}-CH_2-Ph$

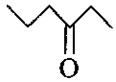
(d) Y is 

34. Compounds A, B and C are isomeric alcohols with formula $C_5H_{12}O$. A on oxidation gives ketone, B gives acid while C is not oxidised, A gives test with I_2/NaOH. The three isomeric alcohols react with HBr with decreasing rates $C > A > B$. Identify A and B.

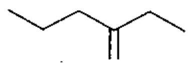
(a) A is  (b) A is  (c) B is  (d) B is 

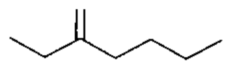
35. An optically active alcohol A ($C_8H_{16}O$) on oxidation gives B. A on heating gives C (C_8H_{14}) as major product. C on ozonolysis produces D (C_5H_8O) and $CH_3-\underset{\underset{O}{\|}}{C}-CH_3$. D on reduction with $LiAlH_4$ gave . Identify correct answers.

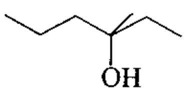
(a) D is 
(b) B is 
(c) A is 
(d) C is 

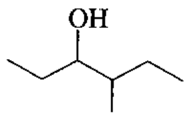
36. Compound A (C_7H_{14}) decolourises Br_2 in CCl_4 and reacts with $Hg(OAc)_2$ followed by reduction with $NaBH_4$ to produce a resolvable compound B. A undergoes reductive ozonolysis to give  as one of the compound.

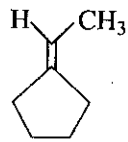
Identify A and B.

(a) A is 

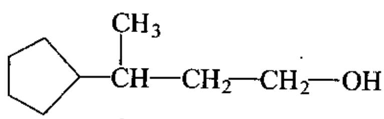
(b) A is 

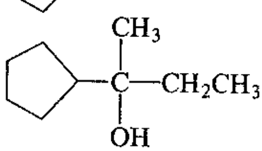
(c) B is 

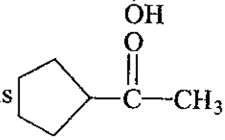
(d) B is 

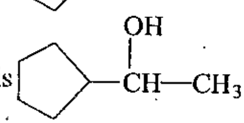
37. A 3° optically active alcohol $C_9H_{18}O$ 'A' on dehydration with conc. H_2SO_4 produces B (C_9H_{16}) which exists in two stereoisomeric forms. For ozonolysis of B followed by work up with Zn - H_2O produces $CH_3—\overset{\overset{\displaystyle O}{\|}}{C}—H$ and C ($C_7H_{12}O$). C on treatment with $LiAlH_4$ produces D ($C_7H_{14}O$). D on dehydration produced .

Identify the correct answers.

(a) A is 

(b) A is 

(c) D is 

(d) D is 

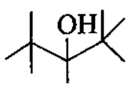
38. A ($C_5H_{12}O$) ether, on reaction with PCl_5 form alkyl chloride B and C. B and C both on reaction with aqueous KOH form alcohol D and E. Both D and E give iodoform test. Identify the correct answers.

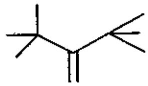
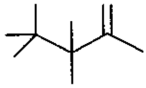
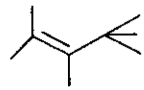
(a) A is $CH_3CH_2—O—CH(CH_3)_2$

(b) C is $CH_3—\underset{\underset{\displaystyle Cl}{|}}{CH}—CH_3$

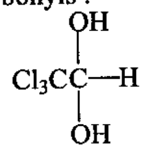
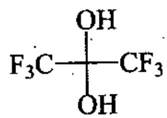
(c) C is $CH_3CH_2CH_2Cl$

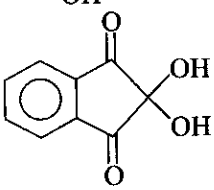
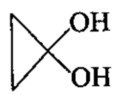
(d) E is $CH_3—\underset{\underset{\displaystyle OH}{|}}{CH}—CH_3$

39.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$; Products can be :

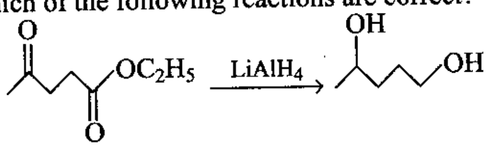
(a)  (b)  (c)  (d) 

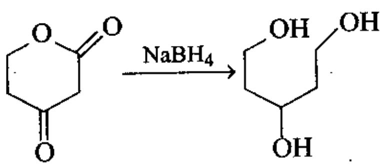
40. Among the following gemdiols which are stable with respect to corresponding carbonyls :

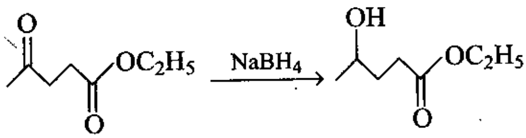
(a)  (b) 

(c)  (d) 

41. Which of the following reactions are correct?

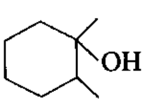
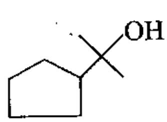
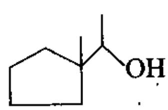
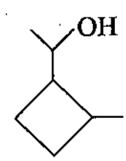
(a) 

(b) 

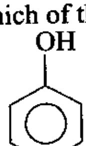
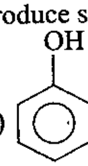
(c) 

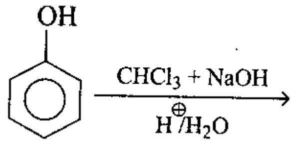
(d) $CH_3—C≡N \xrightarrow{LiAlH_4} CH_3CH_2NH_2$

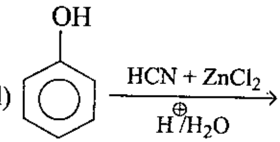
42. Which of the following alcohols will give same alkene on reaction with conc. H_2SO_4?

(a)  (b)  (c)  (d) 

43. Which of the following reactions would produce same product?

(a)  $\xrightarrow[H^{\oplus}/H_2O]{CCl_4 + NaOH}$ (b)  $\xrightarrow[H^{\oplus}/H_2O]{CO_2 + NaOH}$

(c) 

(d) 

44. Which of the following compounds are oxidised by HIO_4?

(a) $CH_2{-}OH$ | CH_2 | $CH_2{-}OH$

(b) $CH_2{-}OH$ | $C{=}O$ | $CH_2{-}OH$

(c) $H{-}C{=}O$ | $CH{-}OH$ | $CH_2{-}OH$

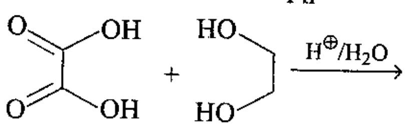
(d) $CH_2{-}OH$ | $CH_2{-}NH_2$

45. Which of the following esterification reactions are unimolecular?

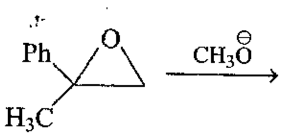
(a) $CH_3{-}\overset{\overset{\large O}{\|}}{C}{-}OH + CH_3OH \xrightarrow{H^{\oplus}/H_2O}$

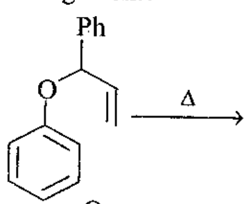
(b) $CH_3{-}\underset{\underset{\large CH_3}{|}}{\overset{\overset{\large CH_3}{|}}{C}}{-}\overset{\overset{\large O}{\|}}{C}{-}OH + C_2H_5OH \xrightarrow{H^{\oplus}/H_2O}$

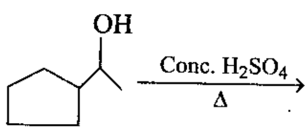
(c) $CH_3{-}\overset{\overset{\large O}{\|}}{C}{-}OH + Ph{-}\underset{\underset{\large Ph}{|}}{\overset{\overset{\large Ph}{|}}{C}}{-}OH \xrightarrow{H^{\oplus}/H_2O}$

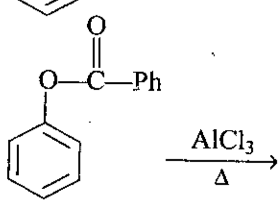
(d) 

46. Which of the following reactions involve rearrangement?

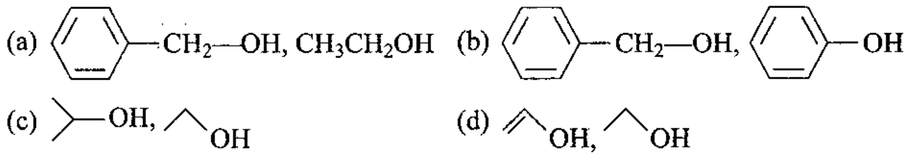
(a) 

(b) 

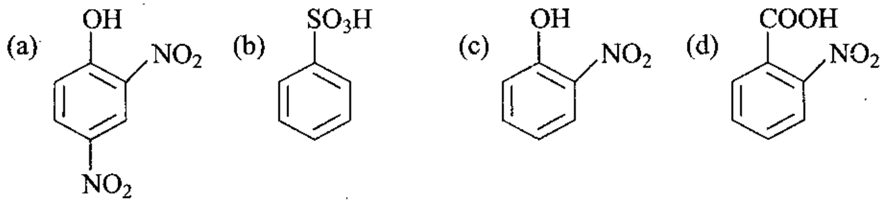
(c) 

(d) 

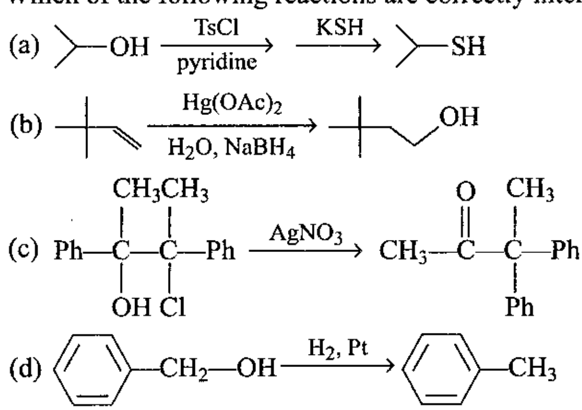
47. Which of the following pairs can be distinguished by using Lucas reagent?



48. Which of the following compounds are soluble in $NaHCO_3$?



49. Which of the following reactions are correctly interpreted?



50. Which of the following reagents can be used for identification of phenol?

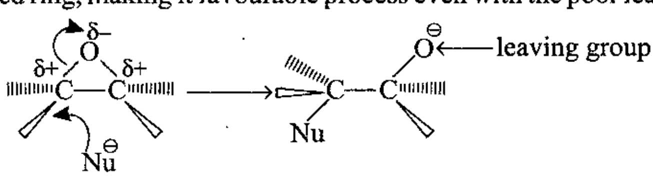
(a) Neutral $FeCl_3$ (b) $NaNO_2$ + HCl

(c) $(NH_4)_2[Ce(NO_3)_6]$ (d) $ZnCl_2$/HCl

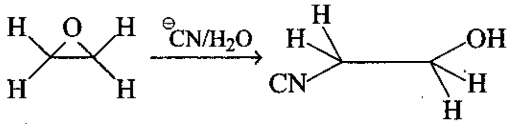
EXERCISE-3 LINKED COMPREHENSION TYPE

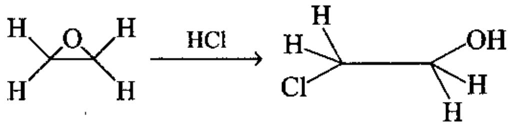
Passage-1

Although epoxides do not contain a good leaving group, they contain a strained three-membered ring with polar bonds. Nucleophilic attack opens the strained three-membered ring, making it favourable process even with the poor leaving group.



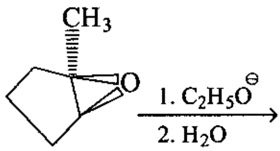
This reaction occurs readily with strong nucleophile, and with acids like HZ, where Z is nucleophilic atom.

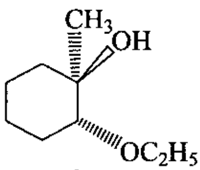
Reaction with strong nucleophile 

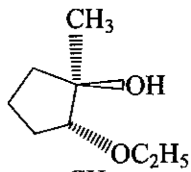
Reaction with HZ 

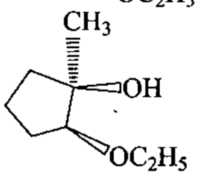
Nucleophile opens the 3-membered ring.

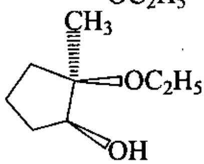
1. Find out correct product of the reaction :

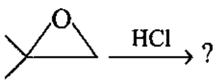


(a) 

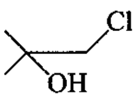
(b) 

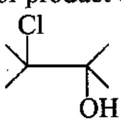
(c) 

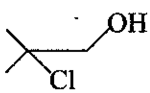
(d) 

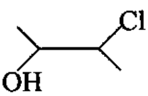
2. 

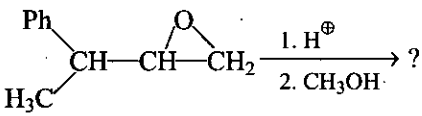
What would be the major product of reaction?

(a) 

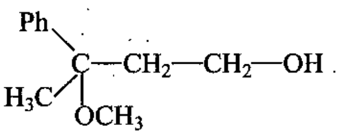
(b) 

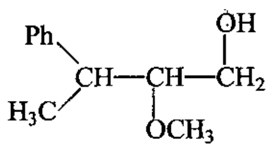
(c) 

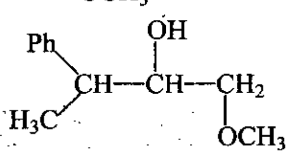
(d) 

3. 

Find out major product of reaction :

(a) 

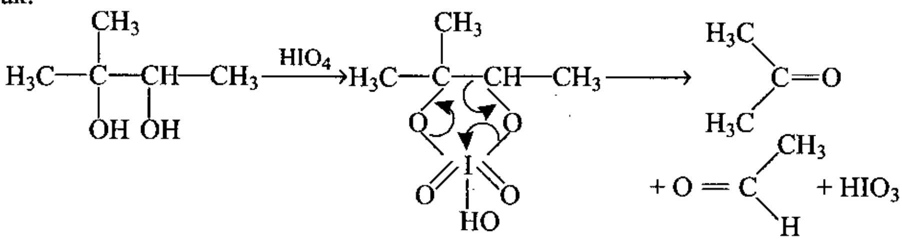
(b) 

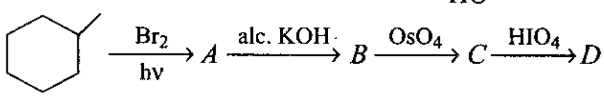
(c) 

(d) None of these

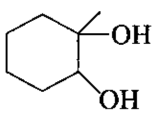
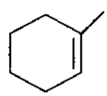
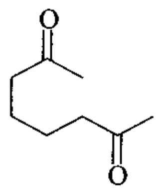
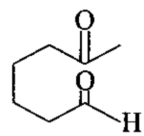
Passage-2

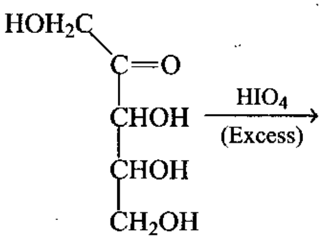
1, 2-diols are oxidized to ketones or aldehydes by periodic acid HIO_4. Periodic acid reacts with diol to form a cyclic intermediate. The reaction takes place because iodine is in a highly positive oxidation state, so it readily accepts electrons. When the intermediate breaks down, the bond between the two carbons bonded to the OH groups break.



4. 

Identify D.

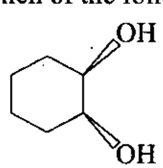
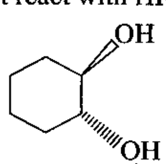
(a)  (b)  (c)  (d) 

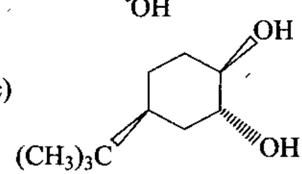
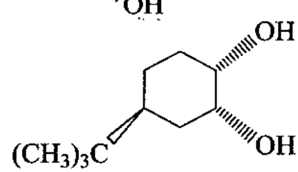
5. 

Which of the following will not form by above reaction?

(a) $H-\overset{\overset{O}{\|}}{C}-H$ (b) CH_3OH (c) CO_2 (d) $H-\overset{\overset{O}{\|}}{C}-OH$

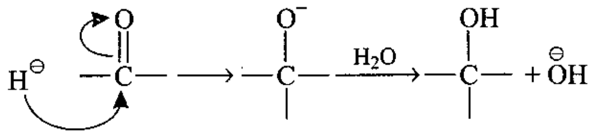
6. Which of the following compounds will not react with HIO_4?

(a)  (b) 

(c)  (d) 

Passage-3

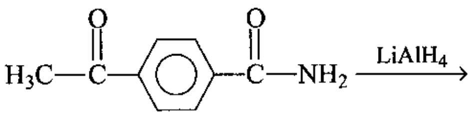
Carbon-oxygen double bond are easily reduced by $NaBH_4$ or $LiAlH_4$. The actual reducing agent in these reduction is hydride ion (H^-).

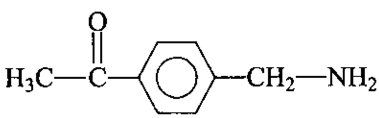
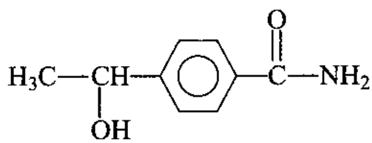


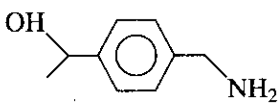
The metal-hydrogen bond in $LiAlH_4$ is more polar than metal-hydrogen bond in $NaBH_4$. As a result $LiAlH_4$ is strong reducing agent than $NaBH_4$. Esters, carboxylic acids, amides cannot be reduced by $NaBH_4$.

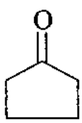
The carbonyl group of amide reduced to methylene group by $LiAlH_4$.

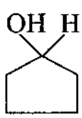
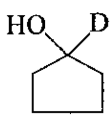
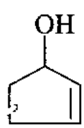
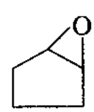
7. Find the correct product of the following reaction :

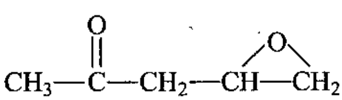


(a) 
(b) 

(c) 
(d) No reaction

8.  $\xrightarrow[H_2O]{NaBD_4}$ '*X*' ; Identify *X* :

(a) 
(b) 
(c) 
(d) 

9.  $\xrightarrow[D_2O]{LiAlH_4}$ '*Y*' ; Identify '*Y*' :

(a) $CH_3-CH(OH)-CH_2-CH(OD)-CH_3$
(b) $CH_3-C(OH)(D)-CH_2-CH_2-OD$

(c) $CH_3-CH(OD)-CH_2-CH(OH)-CH_3$
(d) $CH_3-CH(OD)-CH_2-CH(OD)-CH_3$

Passage-4

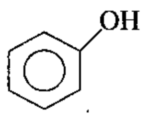
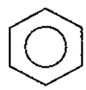
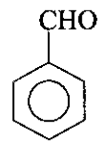
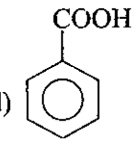
An organic compound (X) on treatment with $CHCl_3$ and KOH gives (Y) and (Z) both of which in turn gives the same compound (T) when distilled with Zn.

Oxidation of (T) yields (S) of formula $C_7H_6O_2$. The sodium salt of (S) with sodalime gives (P) which can also be obtained by distilling (X).

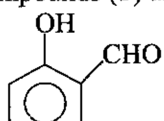
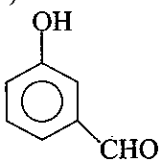
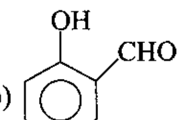
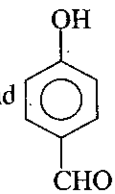
10. The molecular weight of compound (X) is :

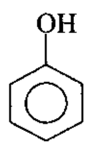
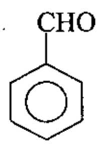
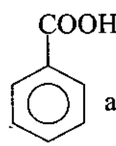
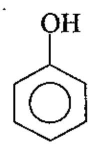
(a) 122 (b) 94 (c) 106 (d) 78

11. The compound (T) is :

(a)  (b)  (c)  (d) 

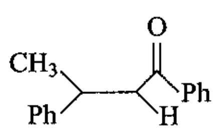
12. Compounds (Y) and (Z) could be :

(a)  and  (b)  and 

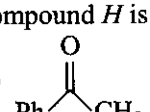
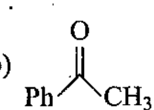
(c)  and  (d)  and 

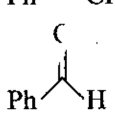
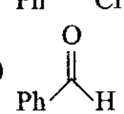
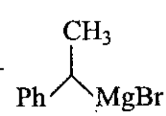
Passage 5

A tertiary alcohol H upon acid catalysed dehydration gives a product I. Ozonolysis of I leads to compound J and K. Compound J upon reaction with KOH gives benzyl alcohol and a compound L, whereas K on reaction with KOH gives only M.

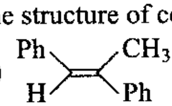
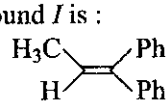
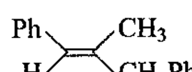
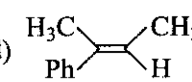
M = 

13. Compound H is formed by the reaction of :

(a)  + PhMgBr (b)  + $PhCH_2MgBr$

(c)  + $PhCH_2MgBr$ (d)  + 

14. The structure of compound I is :

(a)  (b)  (c)  (d) 

15. The structures of compound J, K and L respectively are :

(a) $Ph{-}\overset{O}{\overset{\|}{C}}{-}CH_3$, $Ph{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}CH_3$ and $Ph{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}O^{\ominus}K^{\oplus}$

(b) $Ph{-}\overset{O}{\overset{\|}{C}}{-}H$, $Ph{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}H$ and $Ph{-}\overset{O}{\overset{\|}{C}}{-}O^{\ominus}K^{\oplus}$

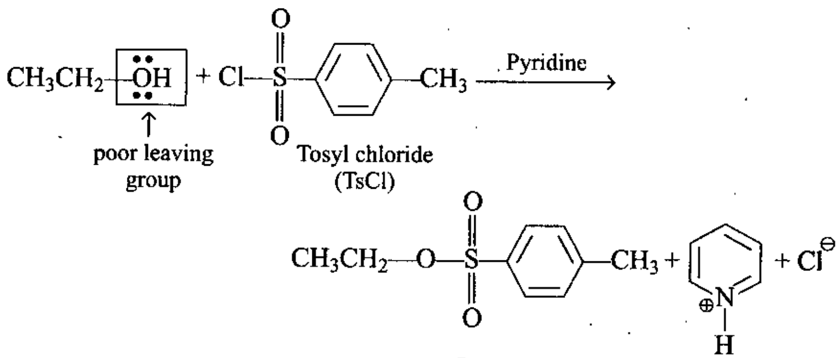
(c) $Ph{-}\overset{O}{\overset{\|}{C}}{-}CH_3$, $Ph{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}H$ and $CH_3{-}\overset{O}{\overset{\|}{C}}{-}O^{\ominus}K^{\oplus}$

(d) $Ph{-}\overset{O}{\overset{\|}{C}}{-}H$, $Ph{-}\overset{O}{\overset{\|}{C}}{-}CH_3$ and $Ph{-}\overset{O}{\overset{\|}{C}}{-}O^{\ominus}K^{\oplus}$

Passage 6

Alcohols are converted to tosylates by treatment with p-toluene sulfonyl chloride (TsCl) in the presence of pyridine. This overall process converts a poor leaving group ($\overset{\ominus}{O}H$) into good one ($\overset{\ominus}{O}Ts$). A tosylate is a good leaving group because its conjugated acid p-toluene sulfonic acid is strong acid.

Because alkyl tosylates have good leaving groups, they undergo both nucleophilic substitution and β-elimination.



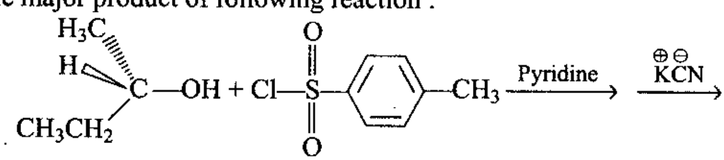
Or

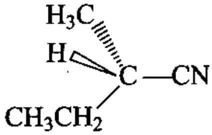
$CH_3CH_2{-}\boxed{OTs}$ ↑ Good leaving group

$$\overset{\oplus\ominus}{NaOCH_3} + CH_3CH_2{-}OTs \xrightarrow{S_N2} CH_3CH_2{-}OCH_3 + \overset{\oplus\ \ominus}{NaOTs}$$

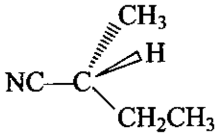
$$\underset{\text{(Alcoholic)}}{\overset{\oplus\ominus}{KOH}} + H{-}CH_2{-}CH_2{-}OTs \xrightarrow{E_2} H_2C{=}CH_2 + \overset{\oplus\ominus}{KOTs}$$

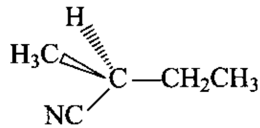
16. Find the major product of following reaction :



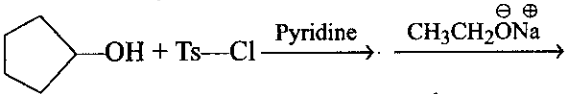
(a) 

(b) $CH_3—CH{=}C{<}^{H}_{CH_3}$

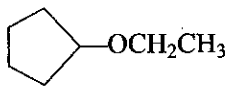
(c) 

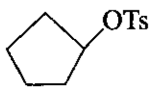
(d) 

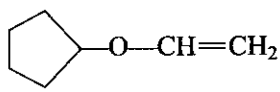
17. What would be the major product of following reactions?



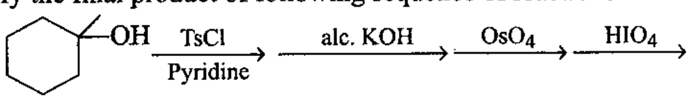
(a) 

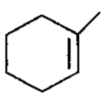
(b) 

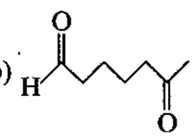
(c) 

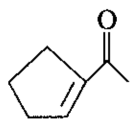
(d) 

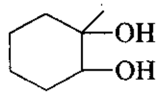
18. Identify the final product of following sequence of reactions :



(a) 

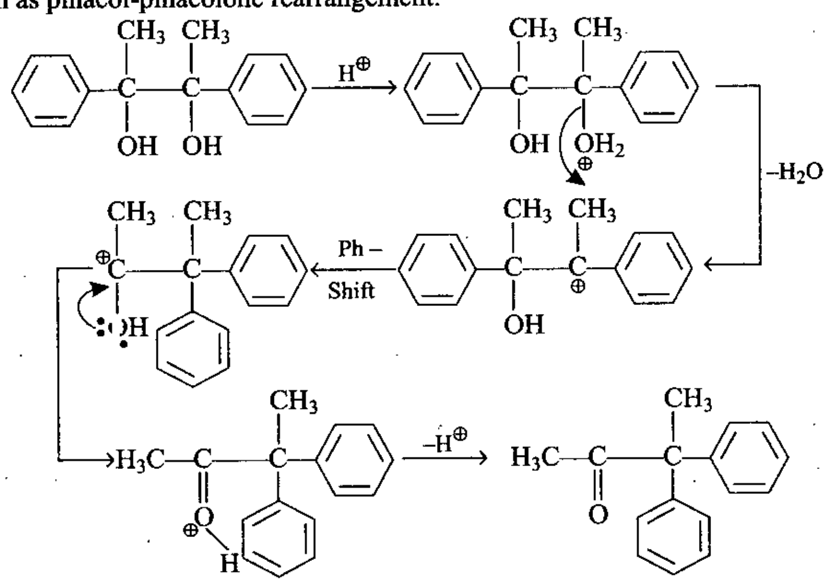
(b) 

(c) 

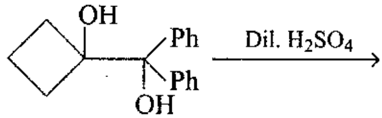
(d) 

Passage 7

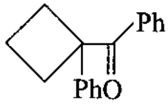
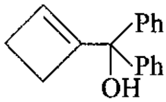
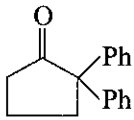
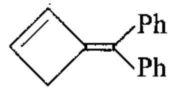
Acid catalysed conversion of 1,2-diol or vicinal diol, into carbonyl compound known as pinacol-pinacolone rearrangement.

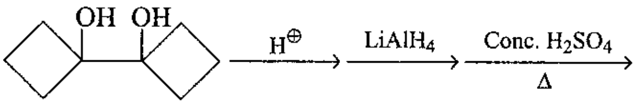


Generally more electron donating group migrate during mechanism, migration of —H is faster because of its smaller size.

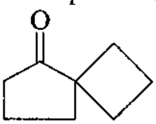
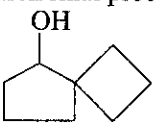
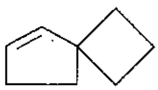
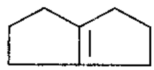


19. What would be the major product of reaction?

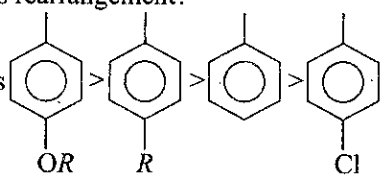
(a)  (b)  (c)  (d) 

20. 

In this sequence of reaction final product is :

(a)  (b)  (c)  (d) 

21. Which of the following is not correct about this rearrangement?

(a) Migratory order for substituent in phenyl is 

(b) The carbocation is stabilised by 1,2-shift

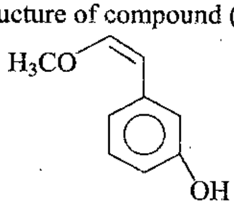
(c) Migratory aptitude for substituent is in R— > H— > C_6H_5

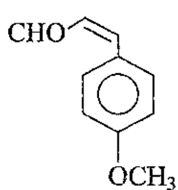
(d) Product of reaction is carbonyl compound.

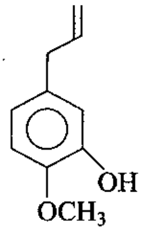
Passage 8

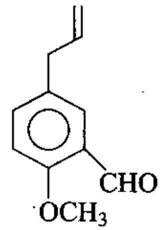
Compound (A) $C_{10}H_{22}O_2$ is insoluble in aq. NaOH but not in $NaHCO_3$. Treatment of (A) with DMSO ($CH_3-\overset{\overset{O}{\|}}{S}-CH_3$) in alkali give ($B$) $C_{11}H_{14}O_2$. Treatment of (A) with strong alkali alone give an isomeric compound (C). When (A) is refluxed with HI, CH_3I is obtained, compound (B) is insoluble in alkali and decolourises Br_2/CCl_4. (B) on treating with strong base gives (D), an isomer of (B). Ozonolysis (C) of gives (E), $C_8H_8O_3$ and isomer of vanilline. Ozonolysis of (D) gives (F) $C_9H_{10}O_3$, which is identical with product of methylation of vanilline (4-hydroxy-3-methoxy benzaldehyde).

22. Structure of compound (A) is :

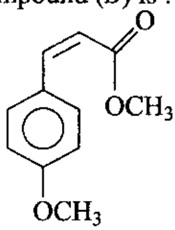
(a) 

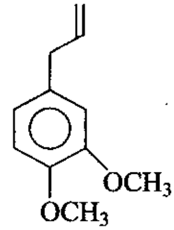
(b) 

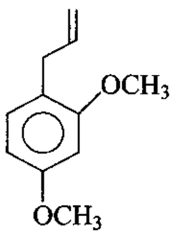
(c) 

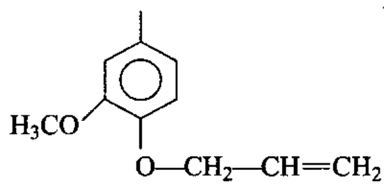
(d) 

23. Compound (*B*) is :

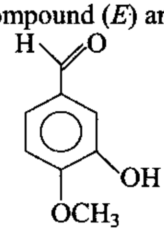
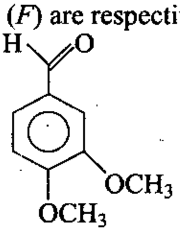
(a) 

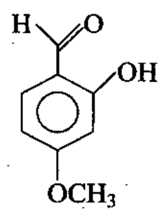
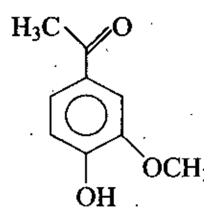
(b) 

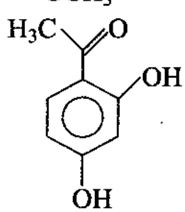
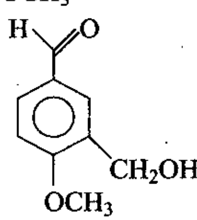
(c) 

(d) 

24. Compound (*E*) and (*F*) are respectively :

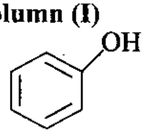
(a)  , 

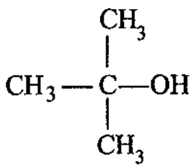
(b)  , 

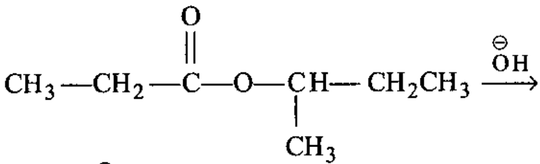
(c)  , 

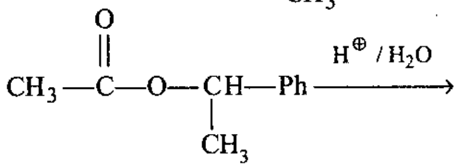
(d) None of these

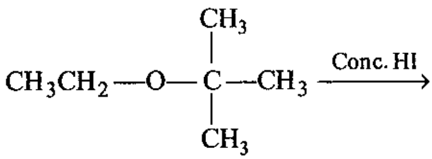
EXERCISE-4 MATRIX MATCH TYPE

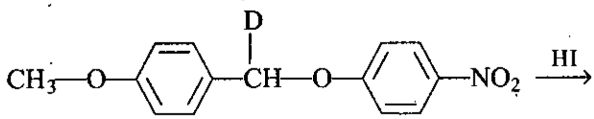
Column (I)	Column (II)
1. (a) 	*P.* White turbidity with $HCl/ZnCl_2$
(b) CH_3CH_2OH	*Q.* Violet colour with $FeCl_3$
(c) $CH_3—\underset{\underset{Ph}{\vert}}{CH}—OH$	*R.* Colour change of $Na_2Cr_2O_7, H^{\oplus}$

(d)  *S*. $I_2/O^{\ominus}H$, gives bright yellow ppt.

2. (a)  *P*. Involve carbocation formation

(b)  *Q*. Acyl cleavage

(c)  *R*. Racemic mixture

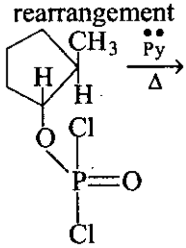
(d)  *S*. Product gives haloform test

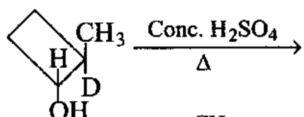
3. (a) Fries rearrangement — *P*. Acid catalysed rearrangement

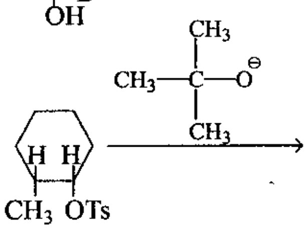
(b) Claisen rearrangement — *Q*. Concerned with ester

(c) Bayer-Villiger's rearrangement — *R*. Involve electrophilic substitution

(d) Pinacole-Pinacolone rearrangement — *S*. Intramolecular rearrangement

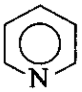
4. (a)  *P*. Hofmann product

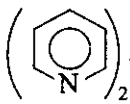
(b)  *Q*. Saytzeff product

(c)  *R*. Rearrangement

(d) $Ph-\underset{H}{\overset{CH_3}{C}}-\overset{OH}{CH}-CH_2-CH_3 \xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$ *S.* Bimolecular elimination

5. (a) Oxidation of 1° alcohol in aldehyde — *P.* $KMnO_4, \Delta, \overset{\ominus}{O}H$

(b)  . HCl. CrO_3 — *Q.* Collin's reagent

(c)  $.CrO_3$ — *R.* Jone's reagent

(d) Oxidation of alkyne into acid — *S.* pcc

6. (a) Identification of 1°, 2° and 3° Alcohol — *P.* Oxymercuration demercuration react

(b) Identification of 1°, 2° and 3° Nitroalkane — *Q.* Cu/300°C, Δ

(c) Formation of alcohol by anti-Markownikoff 's addition — *R.* Victor Meyer test

(d) Formation of alcohol by Markownikoff's addition — *S.* Hydroboration oxidation

T. Lucas test

7. (a) Phenol + Neutral $FeCl_3$ — *P.* No reaction

(b) Phenol + Br_2 (aq.) — *Q.* Violet colour

(c) Phenol + $NaHCO_3$ — *R.* White ppt.

(d) Picric acid + $NaHCO_3$ — *S.* CO_2 gas is evolved

8. (a) $CH_3-\overset{O}{\overset{\|}{C}}-O-\underset{Ph}{\overset{Ph}{C}}-Ph \xrightarrow{H^{\oplus}/H_2O}$ — *P.* Unimolecular

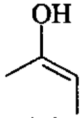
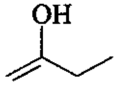
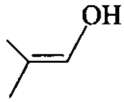
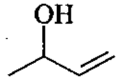
(b) $CH_3-\underset{CH_3}{\overset{CH_3}{C}}-\overset{O}{\overset{\|}{C}}-O-Ph \xrightarrow{H^{\oplus}/H_2O}$ — *Q.* Bimolecular

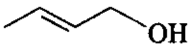
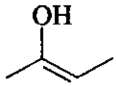
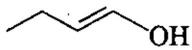
(c) $CH_3-O-\underset{CH_3}{\overset{CH_3}{C}}-CH_3 \xrightarrow{H^{\oplus}/H_2O}$ — *R.* Alkyl oxygen bond cleavage

(d) $CH_3-O-\underset{CH_3}{CH}-CH_3 \xrightarrow{HI}$ — *S.* Acyl oxygen bond cleavage

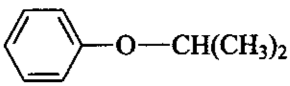
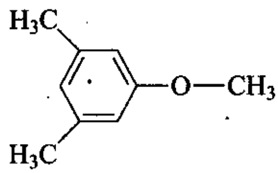
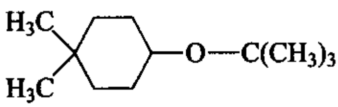
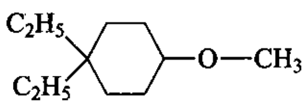
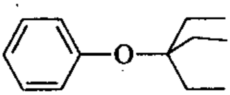
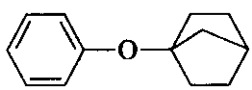
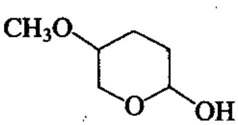
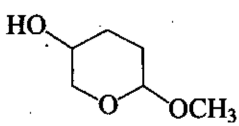
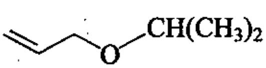
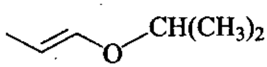
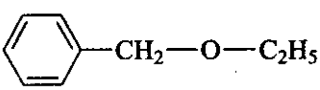
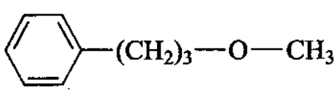
EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

1. How many compounds A through G are enol tautomers of 2-butanone.

 (A),  (B),  (C),  (D)

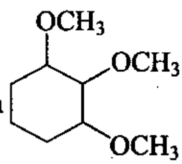
 (E),  (F),  (G)

2. Consider the pairs of ethers A through F show below. To the right of each pairs is a description of reaction conditions to be applied to each. One compound of the pair will react more rapidly than the other. Find out number of reactions in which first ether more rapidly cleaved than second.

	Ether pairs	Conditions
(A)	 and 	Treated with HBr in CH_3—CN, 40°C
(B)	 and 	Treated with H_2SO_4 in CH_3CN, 40°C
(C)	 and 	Treated with H_2SO_4 in CH_3CN, 40°C
(D)	 and 	Treated with 5% aqueous H_2SO_4, 25°C
(E)	 and 	Treated with 5% aqueous H_2SO_4, 25°C
(F)	 and 	Treated with $H^{\oplus}/H_2O$

3. Find out number of moles of HIO_4 that will react with following compound.

$$\begin{array}{c} CHO \\ | \\ CHOH \\ | \\ CHOH \\ | \\ CHOH \\ | \\ CHOH \\ | \\ CH_2OH \end{array}$$

4. How many moles of 'HI' will react with 

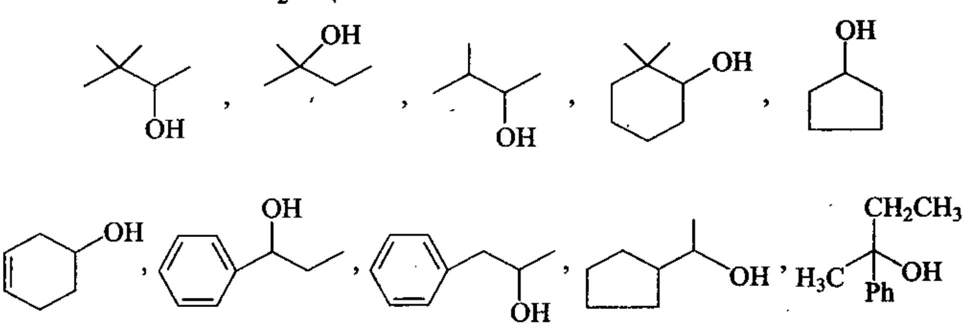
5. $$\begin{array}{l} CH_2-OH \\ | \\ C=O \\ | \\ CH-OH \\ | \\ CH-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} \xrightarrow{5HIO_4} HCHO + \text{'X'}\ HCOOH + CO_2$$, find out the value of 'X'.

6. $R-CH_2-OH \xrightarrow{?} R-CH_2-Cl$

Find out number of reagents that can be used for above conversion, from following.

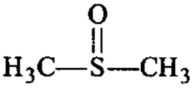
HCl, $ZnCl_2$, PCl_3, PCl_5, $POCl_3$, $SOCl_2$, NaCl, TsCl

7. Identify numbers of alcohol those will show rearrangement during dehydration with concentrate H_2SO_4.

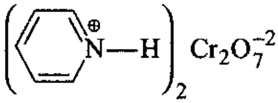


8. Find out number of reagents that converts 1° alcohol to aldehyde.

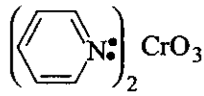
$KMnO_4|H^{\oplus}|\Delta$ (A), $K_2Cr_2O_7|$Dil. H_2SO_4 (B), Ceric ammonium nitrate (C)

 (DMSO)

(D)

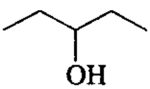


(E)

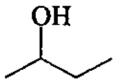


(F)

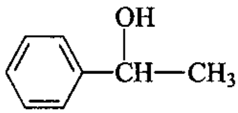
9. Find out number of alcohols that can give positive iodoform test.



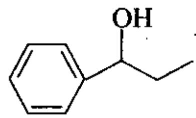
(a)



(b)



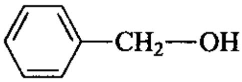
(c)



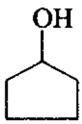
(d)

CH_3-CH_2-OH

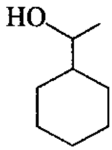
(e)



(f)



(g)



(h)

10. How many moles of HI reacts with glycerol to give 2-iodopropane.

ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (d)	2. (d)	3. (a)	4. (a,b)	5. (b)	6. (c)	7. (b)	8. (a)	9. (b)	10. (d)
11. (d)	12. (b)	13. (d)	14. (c)	15. (b)	16. (c)	17. (d)	18. (a)	19. (a)	20. (c)
21. (a)	22. (a)	23. (c)	24. (b)	25. (a,b,c)	26. (b)	27. (c)	28. (c)	29. (b)	30. (c)
31. (b)	32. (b)	33. (d)	34. (c)	35. (b)	36. (b)	37. (b)	38. (a)	39. (b)	40. (b)
41. (b)	42. (a)	43. (c)	44. (b)	45. (c)	46. (d)	47. (c)	48. (b)	49. (b)	50. (d)

Level-2

1. (b)	2. (a)	3. (b)	4. (c)	5. (c)	6. (c)	7. (a)	8. (c)	9. (d)	10. (d)
11. (c)	12. (d)	13. (c)	14. (c)	15. (a)	16. (a)	17. (c)	18. (c)	19. (b)	20. (c)
21. (d)	22. (b)	23. (c)	24. (a)	25. (a)	26. (b)	27. (c)	28. (d)	29. (c)	30. (c)
31. (c)	32. (a)	33. (b)	34. (b)	35. (a)	36. (c)	37. (b)	38. (a)	39. (b)	40. (a)
41. (b)	42. (c)	43. (b)	44. (b)	45. (a)	46. (c)	47. (a)	48. (b)	49. (c)	50. (b)
51. (c)	52. (a)	53. (d)	54. (c)	55. (a)	56. (a)	57. (d)	58. (b)	59. (d)	60. (c)
61. (d)	62. (d)	63. (c)	64. (d)	65. (d)	66. (c)	67. (b)	68. (d)	69. (c)	70. (a)
71. (a)	72. (b)	73. (b)	74. (b)	75. (c)	76. (a)	77. (d)	78. (a)	79. (a)	80. (b)
81. (d)	82. (c)	83. (a)	84. (b)	85. (b)	86. (c)	87. (a)	88. (c)	89. (b)	90. (c)
91. (c)	92. (c)	93. (b)	94. (b)	95. (c)	96. (a)	97. (d)	98. (b)	99. (a)	100. (a)
101. (a)	102. (c)	103. (c)	104. (c)	105. (d)	106. (b)	107. (a)	108. (c)	109. (a)	110. (a)
111. (d)	112. (b)	113. (c)	114. (a)	115. (b)	116. (b)	117. (c)	118. (c)	119. (b)	120. (b)
121. (a)	122. (c)	123. (b)	124. (c)	125. (d)	126. (a)	127. (b)	128. (c)	129. (b)	130. (c)
131. (a)	132. (b)								

Exercise-2 : More Than One Correct Answers

1.	(a, c)	2.	(b, c, d)	3.	(b, c, d)	4.	(a, c)	5.	(a, b, d)	6.	(c, d)
7.	(a, b, c)	8.	(a, c, d)	9.	(a, b, d)	10.	(b, d)	11.	(a, d)	12.	(a, c)
13.	(a, c)	14.	(a, b, c)	15.	(b, c, d)	16.	(a, b)	17.	(c, d)	18.	(a, b)
19.	(a, b)	20.	(a, b, c)	21.	(a, b, c)	22.	(b, c)	23.	(c, d)	24.	(a, c)
25.	(a, b, c, d)	26.	(a, b, c)	27.	(a, c, d)	28.	(a, b, c, d)	29.	(a, b, d)	30.	(a, b, c, d)
31.	(a, c)	32.	(a, b, d)	33.	(b, c)	34.	(a, c)	35.	(a, b, c, d)	36.	(a, c)
37.	(b, d)	38.	(a, b, d)	39.	(a, b)	40.	(a, b, c, d)	41.	(a, c, d)	42.	(a, b, c)
43.	(a, b)	44.	(b, c, d)	45.	(b, c)	46.	(b, c, d)	47.	(a, b, c)	48.	(a, b, d)
49.	(a, c, d)	50.	(a, b, c)								

Exercise-3 : Linked Comprehension Type

1. (b)	2. (c)	3. (a)	4. (d)	5. (b)	6. (c)	7. (c)	8. (b)	9. (d)	10. (b)
11. (c)	12. (b)	13. (b)	14. (a)	15. (d)	16. (c)	17. (a)	18. (b)	19. (c)	20. (d)
21. (c)	22. (c)	23. (b)	24. (a)						

Exercise-4 : Matrix Match Type

1. (a) $\rightarrow Q$;	(b) $\rightarrow R, S$;	(c) $\rightarrow P, R, S$;	(d) $\rightarrow P$
2. (a) $\rightarrow Q, S$;	(b) $\rightarrow P, R, S$;	(c) $\rightarrow P, S$;	(d) $\rightarrow P, R$
3. (a) $\rightarrow P, Q, R, S$;	(b) $\rightarrow R, S$	(c) $\rightarrow P, Q, S$;	(d) $\rightarrow P, S$
4. (a) $\rightarrow P, S$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow P, S$;	(d) $\rightarrow Q, R$
5. (a) $\rightarrow Q, R, S$;	(b) $\rightarrow S$;	(c) $\rightarrow Q$;	(d) $\rightarrow P$
6. (a) $\rightarrow Q, R, T$;	(b) $\rightarrow R$;	(c) $\rightarrow S$;	(d) $\rightarrow P$
7. (a) $\rightarrow Q$;	(b) $\rightarrow R$;	(c) $\rightarrow P$;	(d) $\rightarrow S$
8. (a) $\rightarrow P, R$;	(b) $\rightarrow P, S$;	(c) $\rightarrow P, R$;	(d) $\rightarrow Q, R$

Exercise-5 : Integer Answer Type Problems

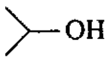
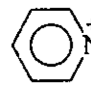
1. (3, A B F)	**2.** (3, B C F)	**3.** (5)	**4.** (6)	**5.** (3)	**6.** (5)	**7.** (6)	**8.** (4)
9. (4)	**10.** (5)						

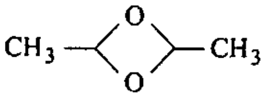
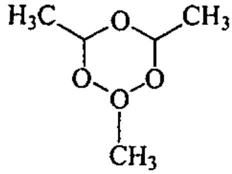
❑❑❑

6 Carbonyl Compounds

EXERCISE-1 ONLY ONE CORRECT ANSWER

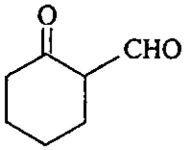
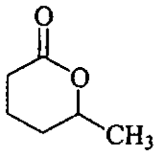
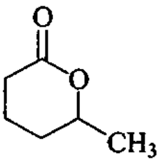
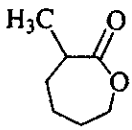
LEVEL-1

1. Which of the following reagents may be used to accomplish the conversion ?
   $C_6H_5CH{=}CH{-}CH_2OH \longrightarrow C_6H_5CH{=}CHCHO$
   (a) $[(CH_3)_3CO]_3Al$,  (b)  —H $ClCrO_3^-$
   (c) MnO_2 (d) All of these
2. The major product obtained from photochemical chlorination of ethylbenzene (in excess) is hydrolyzed with aqueous KOH and the product is then oxidized with PCC. The final product formed is :
   (a) $PhCH_2CHO$ (b) $PhCOCH_3$ (c) PhCHO (d) PhCOOH
3. A compound (A), $C_4H_8Cl_2$, on hydrolysis gives a product (B) which forms a 2, 4-DNP derivative, but does not reduce Tollen's reagent. The compound (A) has the structure :
   (a) $CH_3CH_2CHClCH_2Cl$ (b) $CH_3CH_2CCl_2CH_3$
   (c) $CH_3CH_2CH_2CHCl_2$ (d) $CH_3CHClCHClCH_3$
4. Which of the following compounds does not react with $NaHSO_3$?
   (a) C_6H_5CHO (b) $C_6H_5COCH_3$ (d) CH_3COCH_3 (d) $C_2H_5COC_2H_5$
5. Which of the following will not undergo aldol condensation ?
   (a) Acetaldehyde (b) Propionaldehyde
   (d) Trideuterio acetaldehyde (d) Benzaldehyde
6. In the Cannizzaro reaction, which is the slowest step ?
   $$2\,PhCHO \xrightarrow{OH^-} PhCH_2OH + PhCOO^-$$
   (a) The attack of OH^- at the carboxyl group
   (b) The transfer of hydride to the carbonyl group
   (c) The abstraction of proton from the carboxylic acid
   (d) The deprotonation of $PhCH_2OH$
7. A cyanohydrin of a compound (X) on hydrolysis gives an α - hydroxy acid which shows optical activity after resolution. The compound (X) is :
   (a) acetone (b) formaldehyde
   (c) diethyl ketone (d) acetaldehyde

8. Acetaldehyde on treatment with a few drops of concentrated H_2SO_4 gives :
   (a) $CH_3CHOHCH_2CHO$ (b) $CH_3CH{=}CHCHO$
   (c) 
   (d) 

9. Phenylglyoxal, C_6H_5COCHO, on heating with concentrated NaOH gives :
   (a) C_6H_5COONa and CH_3OH (b) $C_6H_5CH_2OH$ and HCOONa
   (c) $C_6H_5CHOHCOONa$ (d) C_6H_5COONa and HCOONa

10. The most appropriate reagent for the conversion of 2-pentanone into butanoic acid is :
   (a) chromic acid (b) acidified $KMnO_4$
   (c) alkaline $KMnO_4$ (d) sodium hypochlorite

11. 2-Methylcyclohexanone is allowed to react with metachloroperoxobenzoic acid. The major product formed in the reaction is :
   (a) 
   (b) 
   (c) 
   (d) 

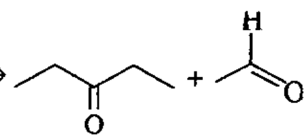
12. Consider the following sequence of reactions.

$$CH_3COCH_3 \xrightarrow[\text{Heat}]{Ba(OH)_2} A \xrightarrow[\text{Heat}]{H_2SO_4} B \xrightarrow{NaBH_4} C$$

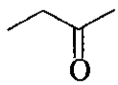
   The final product (C) is :
   (a) $(CH_3)_2C(OH)CH_2COCH_3$ (b) $(CH_3)_2C{=}CHCOCH_3$
   (c) $(CH_3)_2CHCH_2CHOHCH_3$ (d) $(CH_3)_2C{=}CHCHOHCH_3$

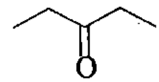
13. Among the following compounds, the one which can undergo both aldol condensation and Cannizzaro reaction is :
   (a) $(CH_3)_2CHCHO$ (b) HCHO
   (c) C_6H_5CHO (d) CH_3CHO

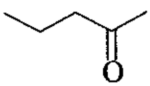
14. Consider the following sequence of reactions.

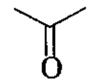
$$\text{Ketone } A \xrightarrow[\text{2. } H_2O]{\text{1. } C_2H_5MgBr} B \xrightarrow[-H_2O]{H_2SO_4\cdot\text{Heat}} C \xrightarrow[\text{2. Zn, } H_2O]{\text{1. } O_3}$$ 

   The ketone (A) is :

(a) 

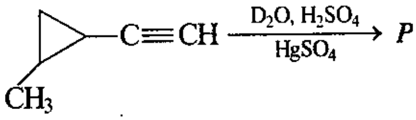
(b) 

(c) 

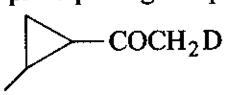
(d) 

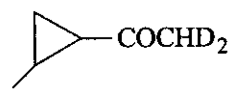
15. The reaction of $C_6H_5CH{=}CHCHO$ with $NaBH_4$ gives :

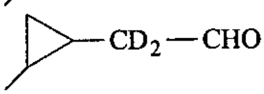
(a) $C_6H_5CH_2CH_2CH_2OH$
(b) $C_6H_5CH{=}CHCH_2OH$
(c) $C_6H_5CH_2CH_2CHO$
(d) $C_6H_5CH_2CHOHCH_3$

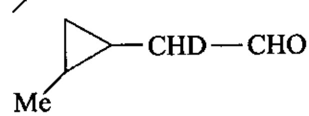
16. 

The principal organic product P is :

(a) 

(b) 

(c) 

(d) 

17. Which one of the following is mixed ketone ?

(a) $CH_3{-}\overset{O}{\overset{\|}{C}}{-}CH_3$
(b) $CH_3{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}CH_3$
(c) $C_6H_5{-}\overset{O}{\overset{\|}{C}}{-}CH_3$
(d) $CH_3{-}C_6H_4{-}\overset{O}{\overset{\|}{C}}{-}C_6H_5$

18. Which one of the following alcohols cannot be oxidized by K_2CrO_4 ?

(a) Ethanol
(b) Tert butyl alcohol
(c) Isopropyl alcohol
(d) Allyl alcohol

19. In the given reaction :

$$CH_3{-}\overset{OH}{\overset{|}{C}H}{-}\underset{CH_3}{\underset{|}{\overset{OH}{\overset{|}{C}}}}{-}CH_3 \xrightarrow{HIO_4} (A)+(B)$$

(A) and (B) respectively be :

(a) CH_3CHO and CH_3CHO
(b) CH_3COCH_3 and CH_3CHO
(c) CH_3COCH_3 and CH_3COCH_3
(d) CH_3COOH and CH_3COCH_3

20. Acetophenone can be obtained by the distillation of :

(a) $(C_6H_5COO)_2Ca$
(b) $(CH_3COO)_2Ca$
(c) $(C_6H_5COO)_2Ca$ and $(CH_3COO)_2Ca$
(d) $(C_6H_5COO)_2Ca$ and $(HCOO)_2Ca$

21. Arrange these compounds in decreasing order of reactivity for the nucleophilic addition reaction.

(I) Acid chloride (II) Aldehyde (III) Ketone (IV) Ester

(a) I > II > III > IV (b) IV > III > II > I

(c) III > II > I > IV (d) I > IV > II > III

22. Two isomeric ketones, 3-pentanone and 2-pentanone can be distinguished by :

(a) I_2/NaOH only (b) $NaSO_3H$ only

(c) NaCN/HCl (d) Both (a) and (b)

23. In the reaction sequence

$$C_6H_5-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3 \xrightarrow{NH_2OH/H^{\oplus}} [X] \xrightarrow{PCl_5} [Y],\ [Y] \text{ will be :}$$

(a) $C_6H_5-\overset{\overset{\displaystyle O}{\|}}{C}-NHCH_3$ (b) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-NH-C_6H_5$

(c) $C_6H_5-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-NH_2$ (d) Mixture of (a) and (b)

24. Schiff's base is prepared from :

(a) carbonyl compound and primary amine

(b) carbonyl compound and secondary amine

(c) carbonyl compound and tertiary amine

(d) all of the above

25. Schiff's reagent is used for the differentiation between :

(a) HCHO and CH_3CHO

(b) CH_3COCH_3 and CH_3CHO

(c) $C_6H_5-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$ and $C_6H_5-\overset{\overset{\displaystyle O}{\|}}{C}-CH_2-CH_3$

(d) HCHO and C_6H_5CHO

26. Fehling solution gives red precipitate with :

(a) aromatic aldehyde (b) saturated aliphatic aldehyde

(c) unsaturated aliphatic aldehyde (d) both (b) and (c)

27. Silver mirror test with Tollen's reagent is given by :

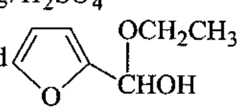
(a) C_6H_5CHO (b) $CH_2=CH-CHO$

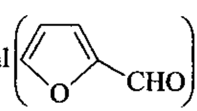
(c) $C_6H_5-CH=CH-CHO$ (d) all of these

28. Acetone can be converted into pinacol by :

(a) $Mg/Hg/H_2O$ (b) Zn/Hg/HCl

(c) $Na/Hg/H_2SO_4$ (d) all of these

29. Compound 

, formed by the reaction of furfural 

with ethanol is :

(a) an aldol
(b) an acetal
(c) a ketal
(d) a hemiacetal

30. Perkin reaction is catalysed by :
(a) NaOH (b) HCl (c) NH_4Cl (d) Pyridine

31. Product of Perkin reaction is :
(a) α, β - unsaturated aldehyde
(b) β - cyclohexyl, α, β - unsaturated aldehyde
(c) β - Aryl - α, β - unsaturated acid
(d) all of the above

32. In the given reaction

$$C_6H_5CHO + X \xrightarrow[\text{(ii) HOH/NH}_4\text{Cl}]{\text{(i) Zn}} C_6H_5—\underset{}{\overset{\overset{\displaystyle OH}{|}}{C}H}—CH_2—COOC_2H_5, [X] \text{ will be:}$$

(a) $CH_3—COOC_2H_5$
(b) $CH_3—CH_2—COOC_2H_5$
(c) $Br—CH_2—COOC_2H_5$
(d) $\begin{matrix} Br \diagdown \\ \quad\; CH—COOC_2H_5 \\ Br \diagup \end{matrix}$

33. Cannizzaro reaction is example of :
(a) redox reaction
(b) disproportionation
(c) both (A) and (B)
(d) only oxidation

34. Cross Cannizzaro reaction is an example of :
(a) redox reaction
(b) disproportionation
(c) both (a) and (b)
(d) oxidation

35. Which will give silver mirror test with Tollen's reagent?
(a) C_6H_5CHO
(b) $CH_3—CHO$
(c) HCOOH
(d) All of these

36. Acetaldehyde cannot give :
(a) Iodoform test
(b) Lucas test
(c) Benedict test
(d) Tollen's test

37. The reaction in which $NaCN/C_2H_5OH/HOH$ is used is :
(a) Perkin reaction
(b) Benzoin condensation
(c) Reimer-Tiemann reaction
(d) Rosenmunds reduction

38. Which one of the following reactions is used for the conversion of ketone into hydrocarbons ?
(a) Aldol condensation
(b) Wolf Kishner reduction
(c) Reimer-Tiemann reaction
(d) Perkin reaction

39. Schiff's reagent gives pink colour with :
(a) acetaldehyde
(b) acetone
(c) acetic acid
(d) methyl acetate

40. Consider the structure of given alcohol, This alcohol can be prepared from :

$$C_6H_5-\underset{\displaystyle C_2H_5}{\overset{\displaystyle OH}{\underset{|}{\overset{|}{C}}}}-CH_3$$

(a) $C_6H_5-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$ and C_2H_5MgBr

(b) $CH_3-CH_2-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$ and C_6H_5MgBr

(c) $C_6H_5-\overset{\displaystyle O}{\overset{\|}{C}}-C_2H_5$ and CH_3MgBr

(d) all of the above

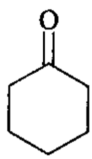
41. In the given reaction, $[X]$ will be :

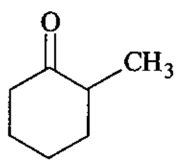
$$C_6H_5-\underset{\displaystyle O}{\underset{\|}{C}}-H \xrightarrow{NH_2OH/H^{\oplus}} [X]$$

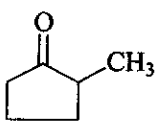
(a) only syn oxime (b) only anti oxime
(c) mixture of syn and anti oxime (d) secondary amide

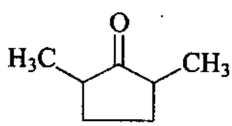
42. In the reaction sequence, $[X]$ is which keton ?

$$[X] \xrightarrow{KMnO_4/\overset{\ominus}{O}H/\Delta} HOOC-(CH_2)_3-\overset{\displaystyle CH_3}{\overset{|}{C}H}-COOH$$

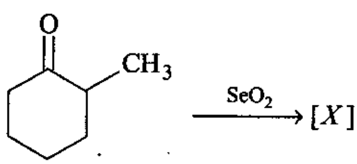
(a) 

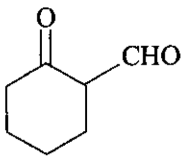
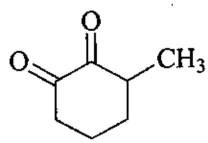
(b) 

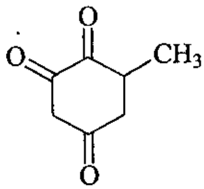
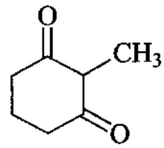
(c) 

(d) 

43. In the given reaction, $[X]$ will be :



(a) 
(b) 

(c) 
(d) 

44. What is the given reaction known as ?

$$CH_3-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{C_6H_5CO_3H} CH_3-\overset{\overset{O}{\|}}{C}-O-CH_3$$

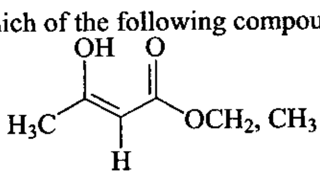
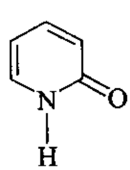
(a) Bayer-villiger oxidation
(b) oppenaur oxidation
(c) Periodate oxidation
(d) Peroxide oxidation

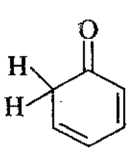
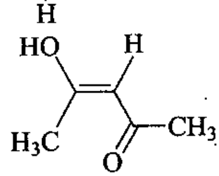
45. In the given reaction, (X) and (Y) will respectively be :

$$X+Y \xrightarrow[5°C]{NaOH} CH_3-\overset{\overset{OH}{|}}{CH}-\underset{\underset{CH_3}{|}}{CH}-CHO$$

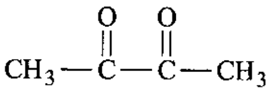
(a) CH_3-CH_2-CHO and CH_3-CH_2-CHO
(b) CH_3-CHO and CH_3-CH_2-CHO
(c) CH_3-CHO and CH_3-CHO
(d) CH_3-CHO and $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CHO$

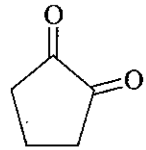
46. Which of the following compounds are in their most stable tautomeric forms ?

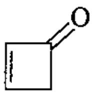
(a) 
(b) 

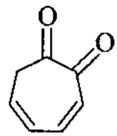
(c) 
(d) 

47. Which of the following compounds have higher enolic content than keto content ?

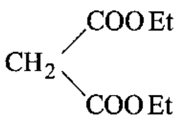
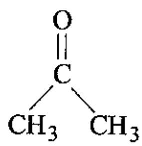
(a) 

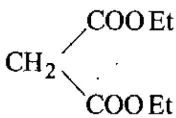
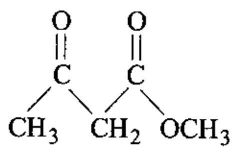
(b) 

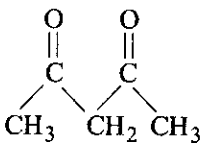
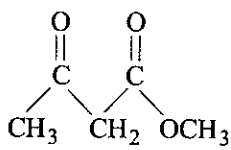
(c) 

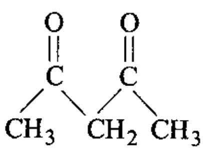
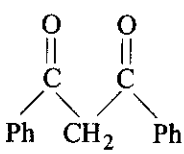
(d) 

48. In which of the following pairs, the first one will have a higher enol content than the second one ?

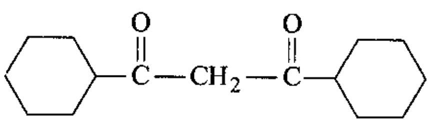
(a)  and 

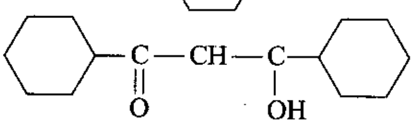
(b)  and 

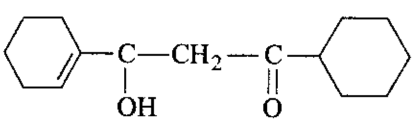
(c)  and 

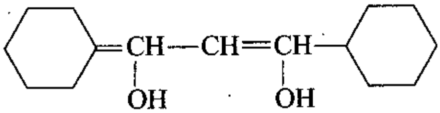
(d)  and 

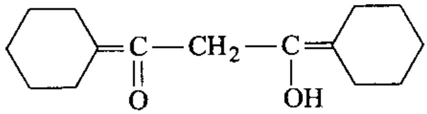
49. Tautomer of the following compound is :

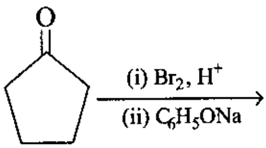


(a) 

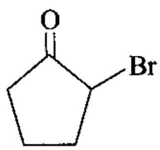
(b) 

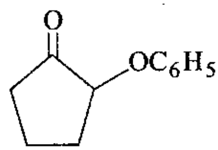
(c) 

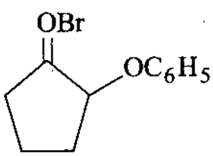
(d) 

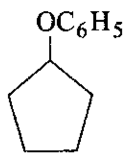
50. 

P, P will be :

(a) 

(b) 

(c) 

(d) 

51. Which of the following is an example of aldol condensation ?

(a) $2CH_3CHO \xrightarrow{\text{dil. NaOH}} CH_3CHOHCH_2CHO$

(b) $HCHO \xrightarrow{\text{dil. NaOH}} CH_3OH$

(c) $C_6H_5CHO + HCHO \xrightarrow{\text{dil. NaOH}} C_6H_5CH_2OH$

(d) $2CH_3COCH_3 \xrightarrow{\text{Conc. NaOH}} CH_3C(OH)(CH_3)CH_2COCH_3$

52. Which of the following would undergo aldol condensation ?

(a) CCl_3CHO

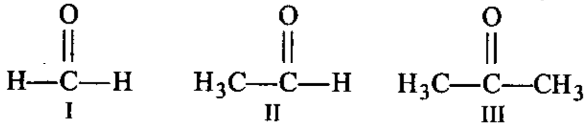
(b) $H_3C-\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-CHO$

(c) CH_3CH_2CHO

(d) HCHO

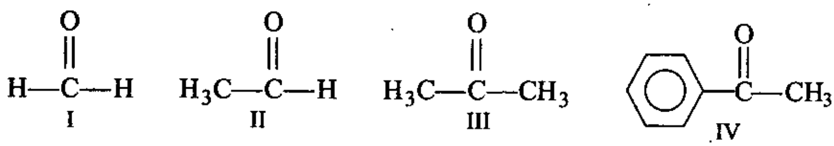
LEVEL-2

1. Mark out the correct order of dipole moment for the following compounds :



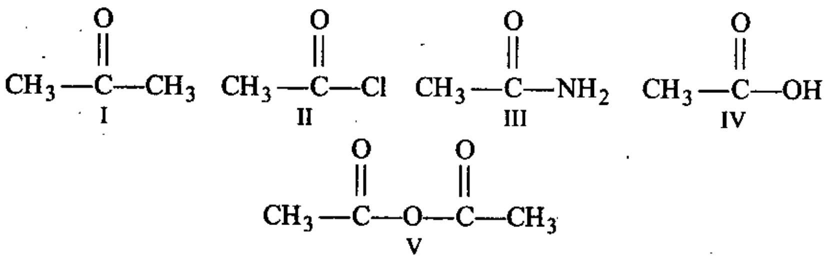
(a) I > II > III (b) II > III > I (c) III > II > I (d) III > I > II

2. Arrange the following compounds in decreasing order of nucleophilic addition reaction :



(a) II > IV > III > I
(b) I > II > III > IV
(c) IV > III > II > I
(d) II > III > IV > I

3. Arrange the following compounds in decreasing order of nucleophilic addition reaction :



(a) II > V > I > IV > III
(b) III > IV > I > V > II
(c) II > I > V > III > IV
(d) IV > III > V > I > II

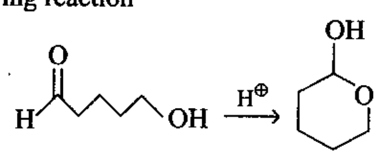
4. In the given reaction sequence

$$C_6H_5CHO \xrightarrow[H^{\oplus},\Delta]{H_2N—OH} A \xrightarrow{P_2O_5} B$$

A and *B* respectively are :

(a) $C_6H_5—CH{=}N—OH, C_6H_5CN$
(b) $C_6H_5—CH{=}N—OH,\ C_6H_5\overset{\overset{\displaystyle O}{\|}}{C}—NH_2$
(c) $C_6H_5—CH{=}N—OH, C_6H_5CHO$
(d) $C_6H_5—CH{=}N—OH, C_6H_5—COOH$

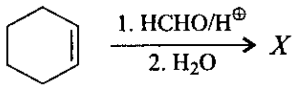
5. Consider the following reaction



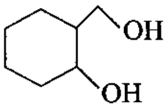
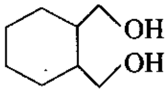
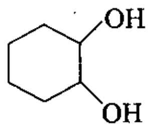
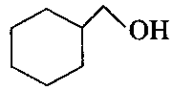
The above reaction is an example of :

(a) intermolecular hemiacetal formation
(b) intramolecular hemiacetal formation
(c) intermolecular acetal formation
(d) intramolecular acetal formation

6. In the given reaction

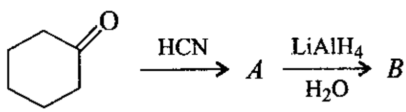


X is :

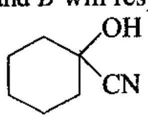
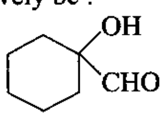
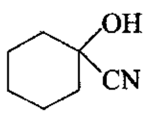
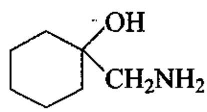
(a)  (b)  (c)  (d) 

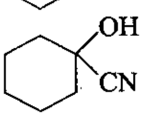
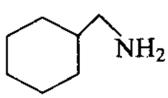
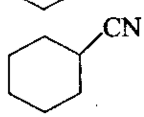
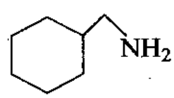
7. Secondary amine react with carbonyl compound to give :
(a) Imine (b) Schiff's base (c) Hydrazone (d) Enamine

8. In the given reaction



A and B will respectively be :

(a)  and  (b)  and 

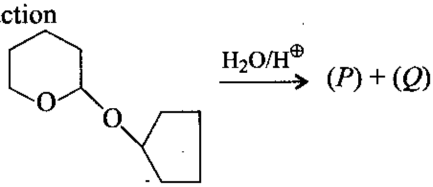
(c)  and  (d)  and 

9. Arrange the compounds in order of decreasing reactivity for nucleophilic addition reaction :

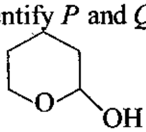
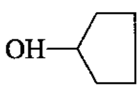
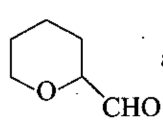
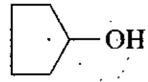
$$\underset{\text{I}}{CH_3-\overset{O}{\overset{\|}{C}}-CH_2-Cl} \quad \underset{\text{II}}{Cl-CH_2-\overset{O}{\overset{\|}{C}}-H} \quad \underset{\text{III}}{H-\overset{O}{\overset{\|}{C}}-H} \quad \underset{\text{IV}}{H_3C-\overset{O}{\overset{\|}{C}}-CH_3}$$

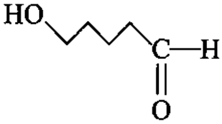
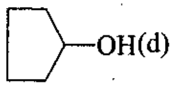
(a) I > IV > II > III (b) I > II > III > IV
(c) II > III > I > IV (d) II > I > III > IV

10. In the given reaction

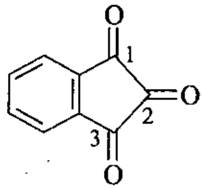


Identify P and Q :

(a)  and  (b)  and 

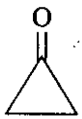
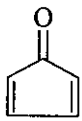
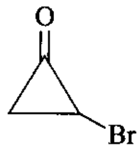
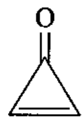
(c)  and  (d) All of these

11. Which carbonyl group of the given compound is most reactive for nucleophilic addition reaction?

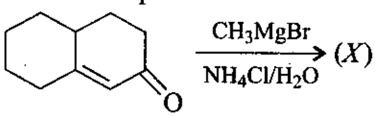


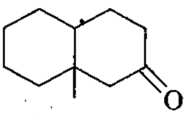
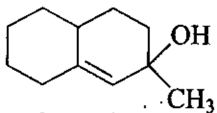
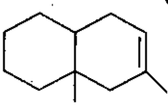
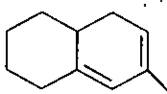
(a) 1 (b) 2
(c) 3 (d) All have equal reactivity

12. Which carbonyl compound has maximum dipole moment?

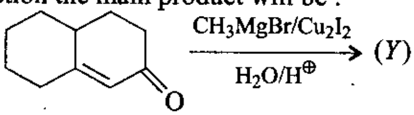
(a)  (b)  (c)  (d) 

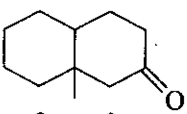
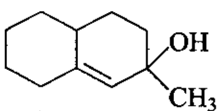
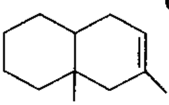
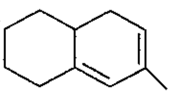
13. In the given reaction the main product will be :



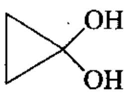
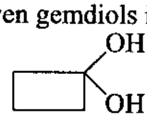
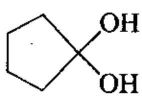
(a)  (b) 
(c)  (d) 

14. In the given reaction the main product will be :



(a)  (b) 
(c)  (d) 

15. Arrange the stability of given gemdiols in decreasing order :

I II III

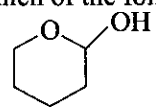
(a) III > II > I (b) I > II > III (c) III > I > II (d) II > III > I

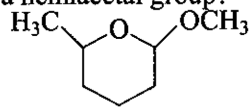
16. Which one of the following compounds would form most stable hydrate?

(a) $Cl_3C-\overset{O}{\overset{\|}{C}}-H$ (b) $H_3C-\overset{O}{\overset{\|}{C}}-H$

(c) $F_3C-\overset{O}{\overset{\|}{C}}-CF_3$ (d) $H-\underset{O}{\underset{\|}{C}}-H$

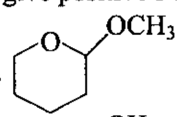
17. Which of the following structures contains a hemiacetal group?

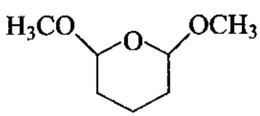
(a) 

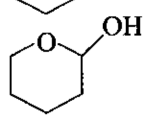
(b) 

(c) $H_3C-\overset{OH}{\overset{|}{\underset{OCH_3}{\underset{|}{C}}}}-CH_3$ (d) $C_6H_5-CH\left\langle\begin{matrix}OCH_3\\OCH_3\end{matrix}\right.$

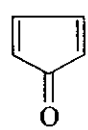
18. Which of the following compounds would give positive Fehling's solution test?

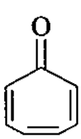
(a) $C_6H_5-\overset{O}{\overset{\|}{C}}-CH_3$ (b) 

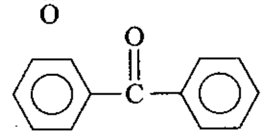
(c) 

(d) 

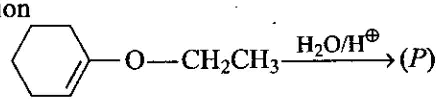
19. Which of the following carbonyl compounds when treated with dilute acid forms a stable cation?

(a) $H_3C-\overset{O}{\overset{\|}{C}}-CH_3$ (b) 

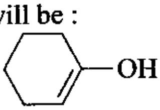
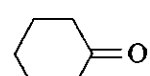
(c) 

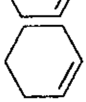
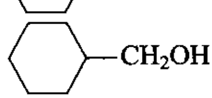
(d) 

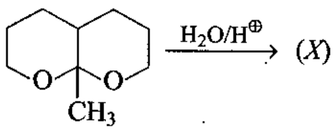
20. In the given reaction



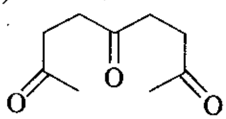
P will be :

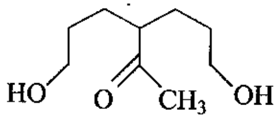
(a)  (b) 

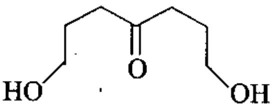
(c)  (d) 

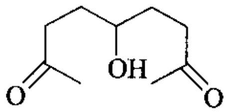
21. 

(X) will be :

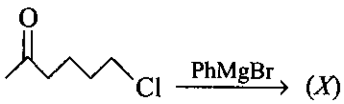
(a) 

(b) 

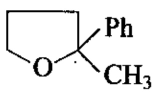
(c) 

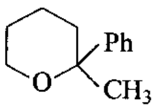
(d) 

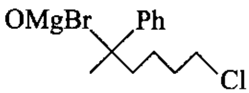
22. In the given reaction

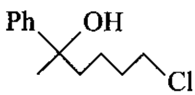


(X) will be :

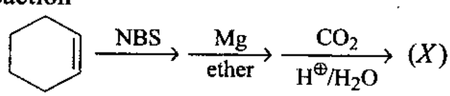
(a) 

(b) 

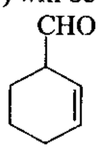
(c) 

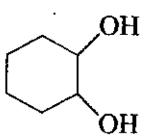
(d) 

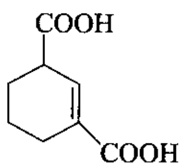
23. In the given reaction

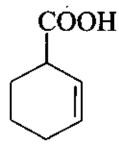


(X) will be :

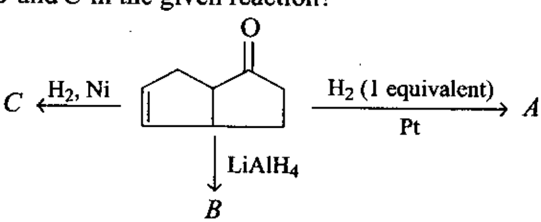
(a) 

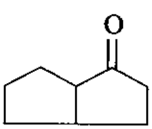
(b) 

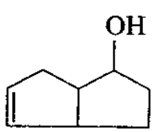
(c) 

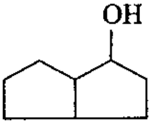
(d) 

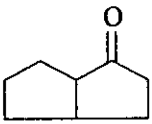
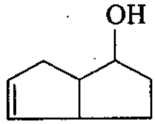
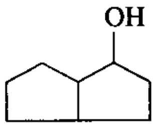
24. What are A, B and C in the given reaction?



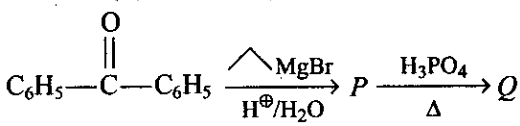
(a)  in all cases

(b)  in all cases

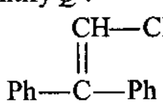
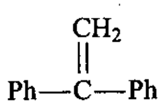
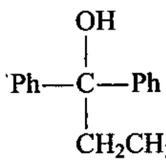
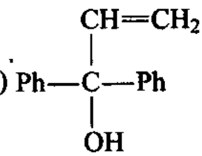
(c)  in all cases

(d)   and 

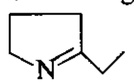
(*A*) (*B*) (*C*)

25. 

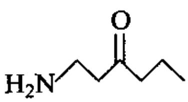
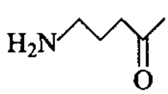
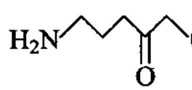
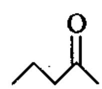
Identify Q :

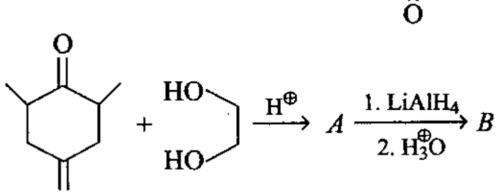
(a)  (b)  (c)  (d) 

26. Which one of the following combinations gives compound (X)?

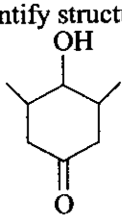
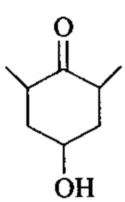
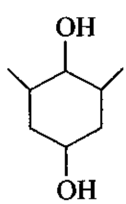
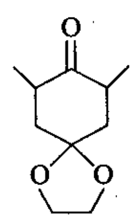


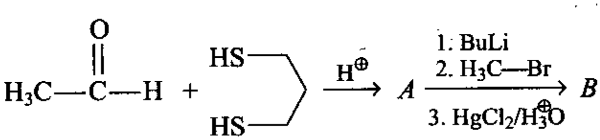
(X)

(a)  (b)  (c)  (d) 

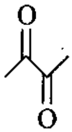
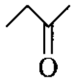
27. 

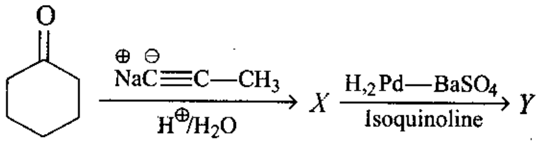
Identify structure of B :

(a)  (b)  (c)  (d) 

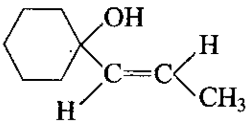
28. 

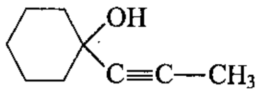
Identify structure of B :

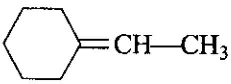
(a)  (b)  (c)  (d) $\mathrm{H-\overset{\overset{O}{\|}}{C}-H}$

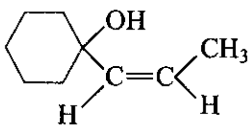
29. 

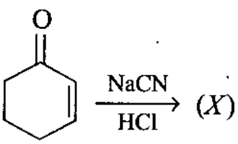
Identify structure of Y :

(a) 

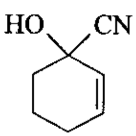
(b) 

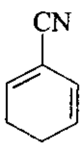
(c) 

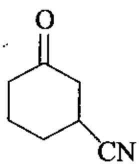
(d) 

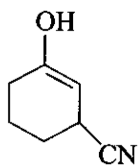
30. 

(X) is :

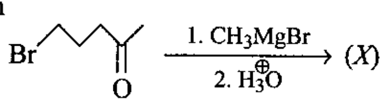
(a) 

(b) 

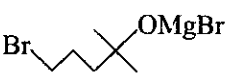
(c) 

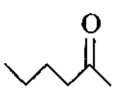
(d) 

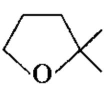
31. In the given reaction

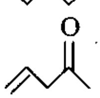


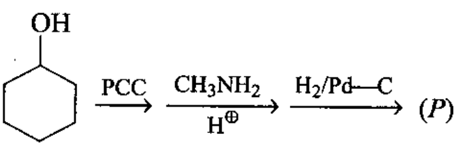
(X) will be :

(a) 

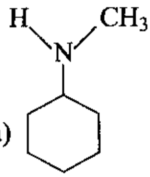
(b) 

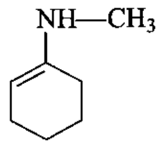
(c) 

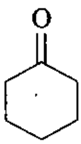
(d) 

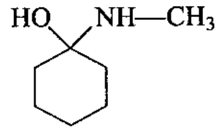
32. 

P will be :

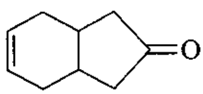
(a) 

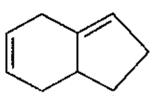
(b) 

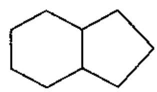
(c) 

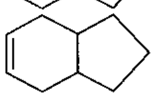
(d) 

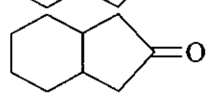
33. In the given reaction

 $\xrightarrow{H_2N—NH_2/\overset{\ominus}{O}H}$ Product :

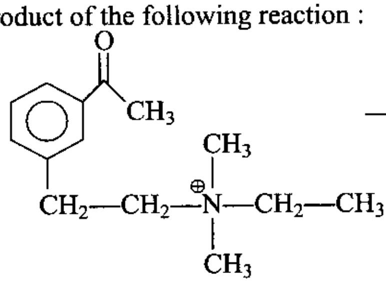
(a) 

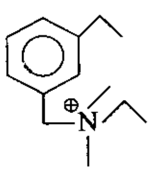
(b) 

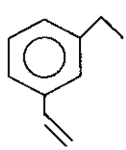
(c) 

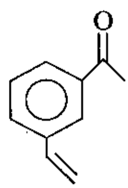
(d) 

34. Find the product of the following reaction :

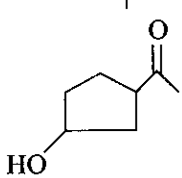
 $\xrightarrow[\Delta]{NH_2—NH_2/KOH}$

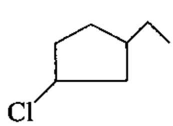
(a) 

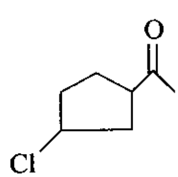
(b) 

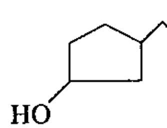
(c) 

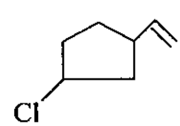
(d) None of these

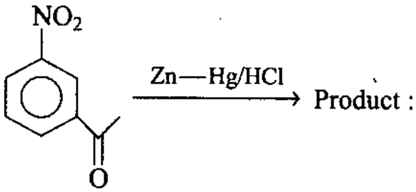
35.  $\xrightarrow[HCl]{Zn—Hg}$ Product :

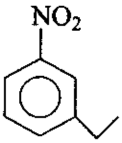
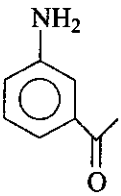
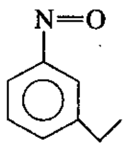
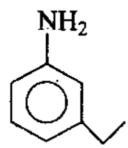
(a) 

(b) 

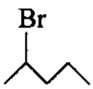
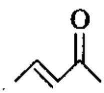
(c) 

(d) 

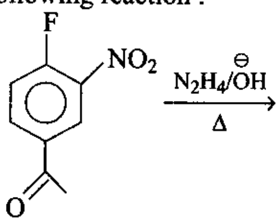
36. 

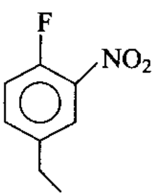
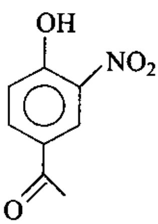
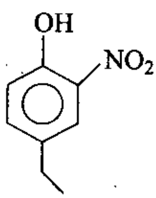
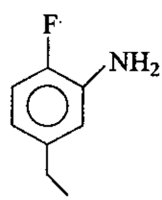
(a)  (b)  (c)  (d) 

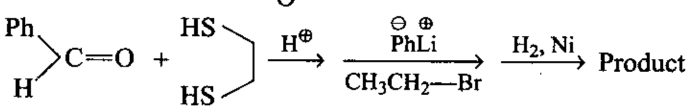
37. $CH_3-\underset{\underset{Br}{|}}{CH}-CH_2-\overset{\overset{O}{||}}{C}-CH_3 \xrightarrow[\Delta]{N_2H_4,\ \overset{\ominus}{O}H}$ Product :

(a)  (b)  (c)  (d) 

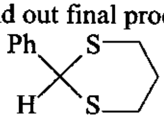
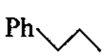
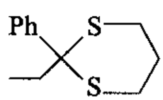
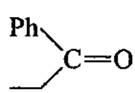
38. Find the product of the following reaction :

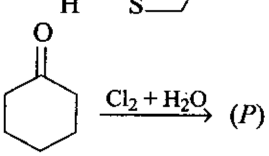


(a)  (b)  (c)  (d) 

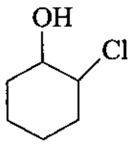
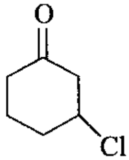
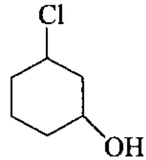
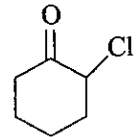
39. 

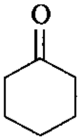
Find out final product of reaction :

(a)  (b)  (c)  (d) 

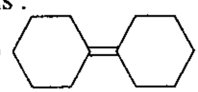
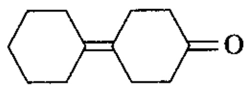
40. 

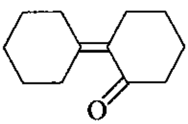
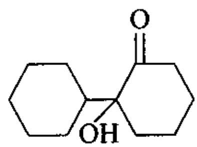
P will be :

(a)  (b)  (c)  (d) 

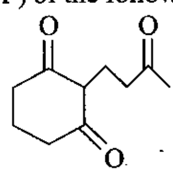
41.  $\xrightarrow[\Delta]{\text{NaOH}}$ (*A*)

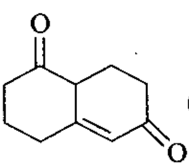
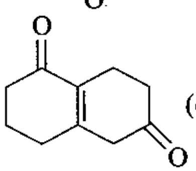
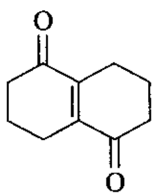
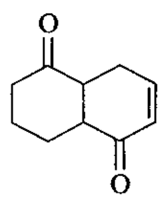
A is :

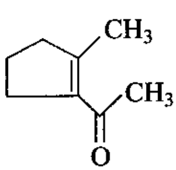
(a)  (b) 

(c)  (d) 

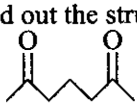
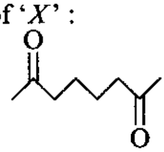
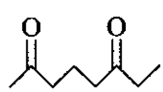
42. What is the product (*X*) of the following reaction?

 $\xrightarrow{\overset{\ominus}{O}H/\Delta}$ (*X*)

(a)  (b)  (c)  (d) 

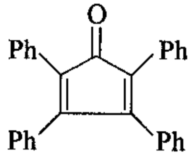
43. $X \xrightarrow[\Delta]{\text{KOH}}$ 

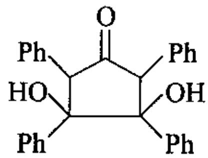
Find out the structure of '*X*' :

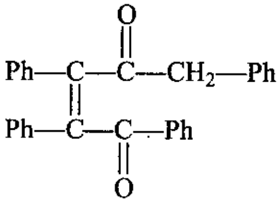
(a)  (b)  (c)  (d) None of these

44. Find the product of following reaction :

$$Ph-CH_2-\overset{\overset{O}{||}}{C}-CH_2-Ph + Ph-\overset{\overset{O}{||}}{C}-\overset{\overset{O}{||}}{C}-Ph \xrightarrow[\Delta]{\text{NaOH}}$$

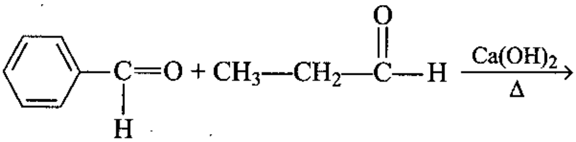
(a) 

(b) 

(c) 

(d) None of these

45. Find the major product of given reaction :

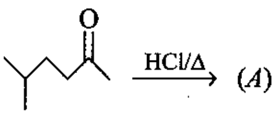


(a) $Ph—CH=CH—CH_2—\overset{\overset{O}{\|}}{C}—H$

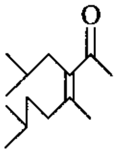
(b) $CH_3CH_2—CH=\underset{\underset{CH_3}{|}}{C}—\overset{\overset{O}{\|}}{C}—H$

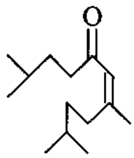
(c) $CH_3CH_2CH=CH—CH_2—\overset{\overset{O}{\|}}{C}—H$

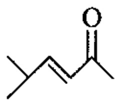
(d) $Ph—CH=\underset{\underset{CH_3}{|}}{C}—\overset{\overset{O}{\|}}{C}—H$

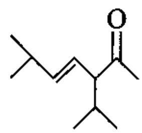
46. 

What is (A)?

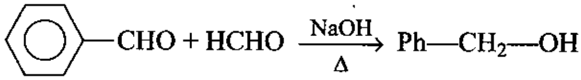
(a) 

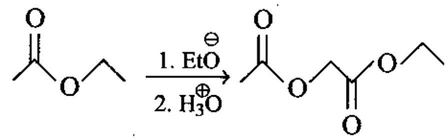
(b) 

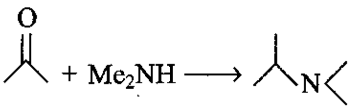
(c) 

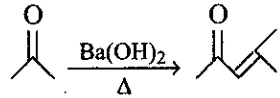
(d) 

47. Which of the following is an example of aldol condensation reaction?

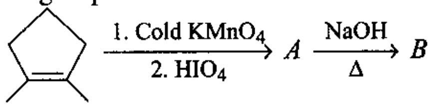
(a) 

(b) 

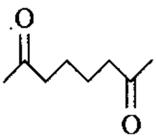
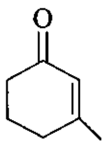
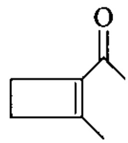
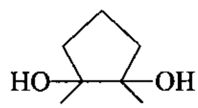
(c) 

(d) 2 

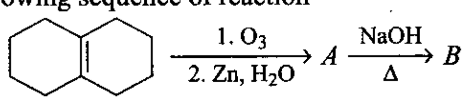
48. Consider the following sequence of reaction



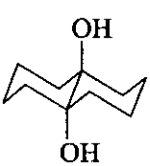
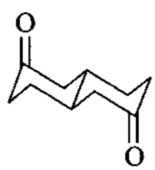
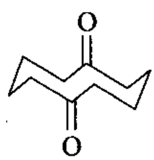
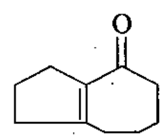
The product B is :

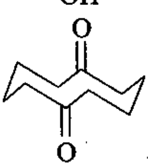
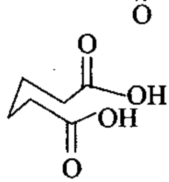
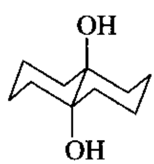
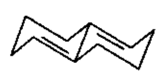
(a)  (b)  (c)  (d) 

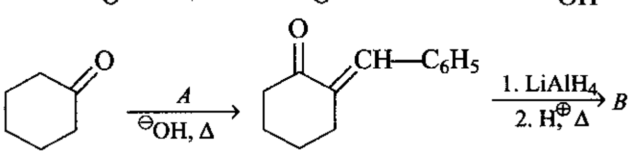
49. Consider the following sequence of reaction



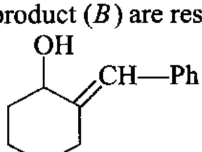
Product A and B respectively :

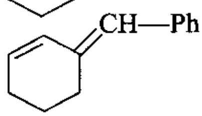
(a)  and  (b)  and 

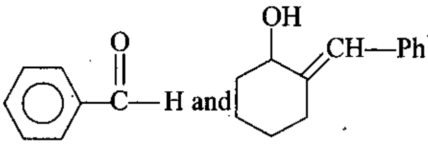
(c)  and  (d)  and 

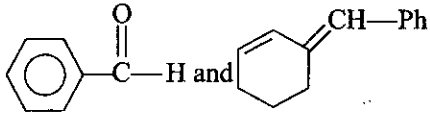
50. 

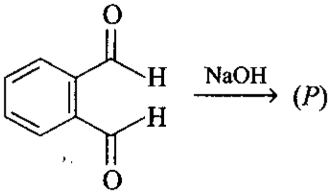
Reactant (A) and product (B) are respectively :

(a) Ph—CH$_3$ and 

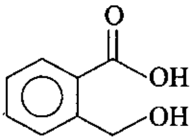
(b) Ph—CH$_3$ and 

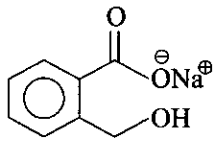
(c) 

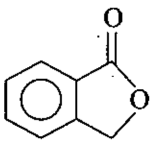
(d) 

51. 

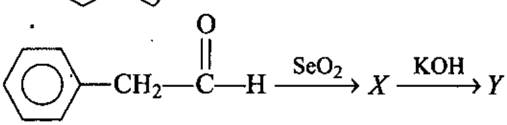
P will be :

(a) 

(b) 

(c) 

(d) None of these

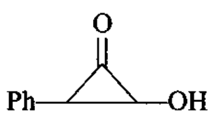
52. 

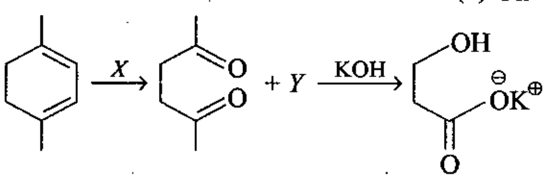
Identify final product 'Y' :

(a) $Ph-\overset{\overset{\large OH}{|}}{C}H-\overset{\overset{\large O}{||}}{C}-\overset{\ominus}{O}K^{\oplus}$

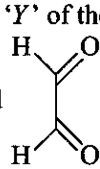
(b) $Ph-CH_2-\overset{\overset{\large O}{||}}{C}-OH$

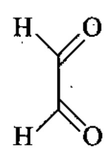
(c) $Ph-\overset{\overset{\large O}{||}}{C}-\overset{\overset{\large O}{||}}{C}-H$

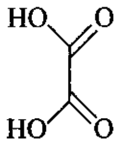
(d) 

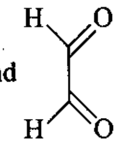
53. 

Identify 'X' and 'Y' of the above reaction :

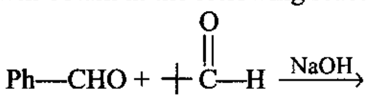
(a) O_3/Ag_2O and 

(b) $O_3/Zn-H_2O$ and 

(c) $KMnO_4$ and 

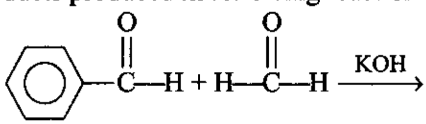
(d) $KMnO_4$ and 

54. How many products will obtain in the following reaction?



(a) 2 (b) 3 (c) 4 (d) 1

55. Find out no. of products produced in following reaction :



(a) 1 (b) 4 (c) 3 (d) 2

56. $2\ \begin{array}{l} CHO \\ | \\ COOH \end{array} \xrightarrow{NaOH} P + Q$

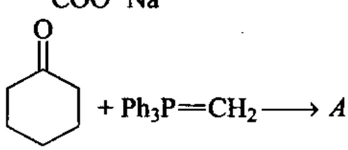
P and Q are respectively :

(a) $\begin{array}{l} CH_2—OH \\ | \\ COO^{\ominus}Na^{\oplus} \end{array}$ and $\begin{array}{l} COO^{\ominus}Na^{\oplus} \\ | \\ COO^{\ominus}Na^{\oplus} \end{array}$

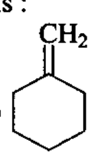
(b) $\begin{array}{l} CH_2OH \\ | \\ COO^{\ominus}Na^{\oplus} \end{array}$ and $\begin{array}{l} CH_2OH \\ | \\ COO^{\ominus}Na^{\oplus} \end{array}$

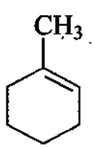
(c) $\begin{array}{l} COO^{\ominus}Na^{\oplus} \\ | \\ COO^{\ominus}Na^{\oplus} \end{array}$ both

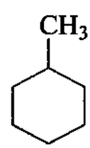
(d) $\begin{array}{l} CH_2OH \\ | \\ COO^{\ominus}Na^{\oplus} \end{array}$ both

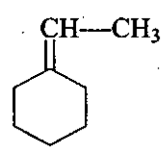
57. 

A is :

(a) 

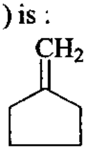
(b) 

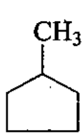
(c) 

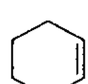
(d) 

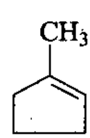
58. $H_3C—\overset{\overset{O}{\|}}{C}—CH_2—CH_2—CH_2—CH_2—\overset{\oplus}{P}Ph_3 \xrightarrow[\Delta]{\overset{\ominus\ \oplus}{Bu\ Li}} (X)$; Major product

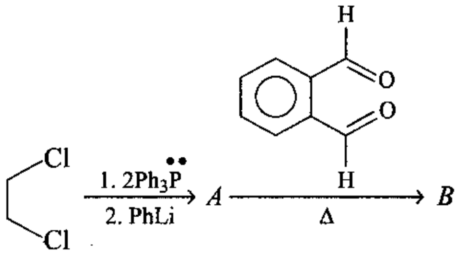
(X) is :

(a) 

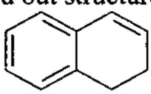
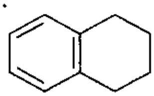
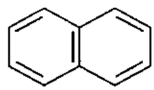
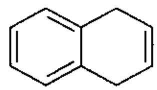
(b) 

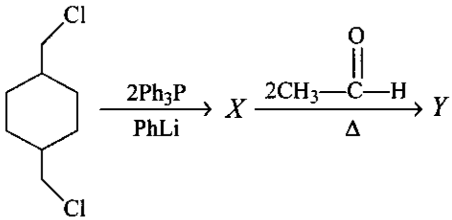
(c) 

(d) 

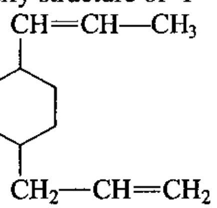
59. 

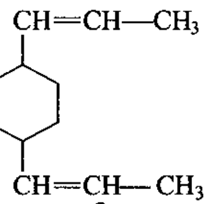
Find out structure of B :

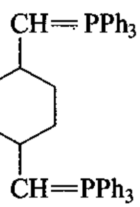
(a)  (b)  (c)  (d) 

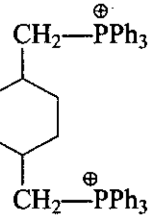
60. 

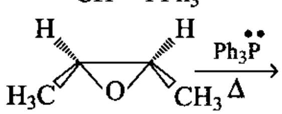
Identify structure of 'Y' :

(a) 

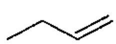
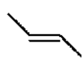
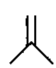
(b) 

(c) 

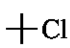
(d) 

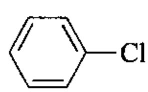
61. 

(X); Major product (X) is :

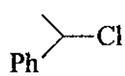
(a)  (b)  (c)  (d) 

62. Which halide will give Wittig reaction?

(a) 

(b) 

(c) $H_2C{=}CH{-}Cl$

(d) 

63. Find the product of following reaction

$$2CH_3CH_2-\overset{\overset{\large O}{\|}}{C}-OC_2H_5 \xrightarrow[H_3\overset{\oplus}{O}]{C_2H_5\overset{\ominus}{O}} (X)$$

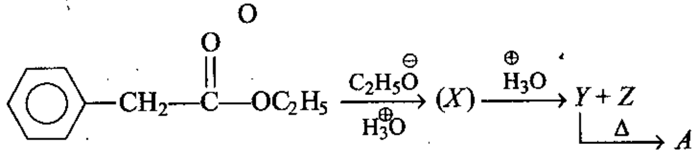
'X' will be :

(a) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-OC_2H_5$

(b) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-CH_2-CH_2-\overset{\overset{O}{\|}}{C}-OC_2H_5$

(c) $2CH_3CH_2-\overset{\overset{O}{\|}}{C}-OH$

(d) $CH_3-\underset{\underset{CH_2-\underset{\underset{O}{\|}}{C}-OC_2H_5}{|}}{CH}-\overset{\overset{O}{\|}}{C}-OC_2H_5$

64. 

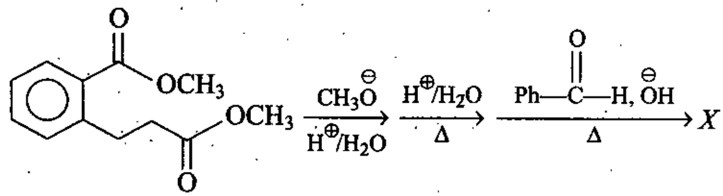
Find final product 'A' :

(a) $Ph-CH_2-\overset{\overset{O}{\|}}{C}-\underset{\underset{Ph}{|}}{CH}-\overset{\overset{O}{\|}}{C}-OC_2H_5$

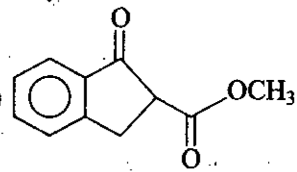
(b) $Ph-CH_2-\overset{\overset{O}{\|}}{C}-CH_2-Ph$

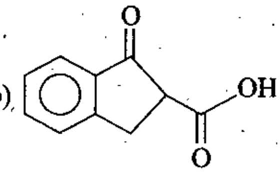
(c) $Ph-\overset{\overset{O}{\|}}{C}-CH_2-CH_2-\overset{\overset{O}{\|}}{C}-OH$

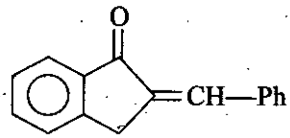
(d) $Ph-CH_2-\overset{\overset{O}{\|}}{C}-\underset{\underset{Ph}{|}}{CH_2}-\overset{\overset{O}{\|}}{C}-OH$

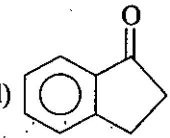
65. 

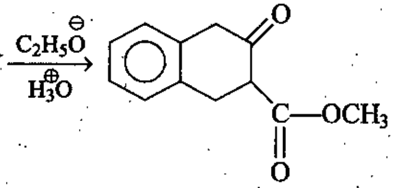
Identify 'X' :

(a) 

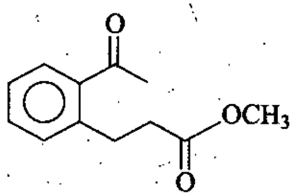
(b) 

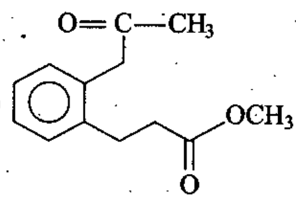
(c) 

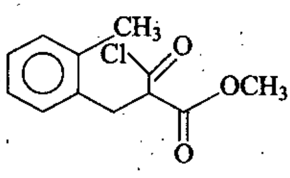
(d) 

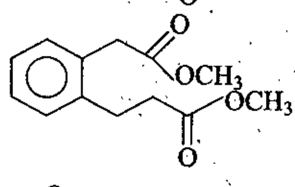
66. X 

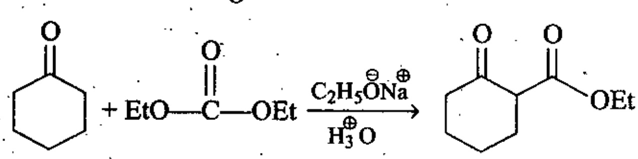
Find correct structure of 'X' :

(a) 

(b) 

(c) 

(d) 

67. 

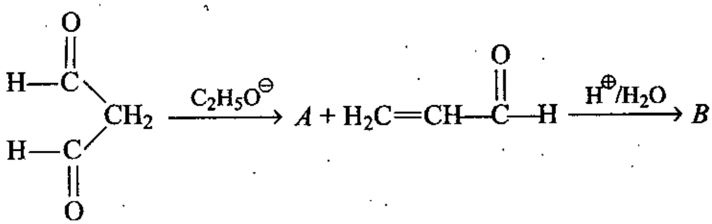
Identify name of reaction :

(a) Aldol condensation

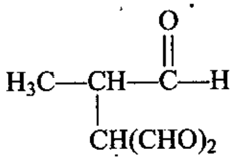
(b) Cannizzaro condensation

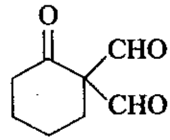
(c) Crossed Claisen condensation

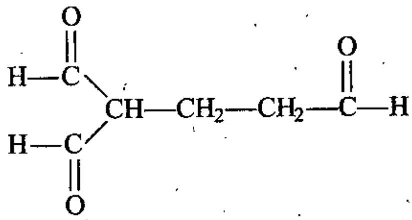
(d) Tischenko reaction

68. 

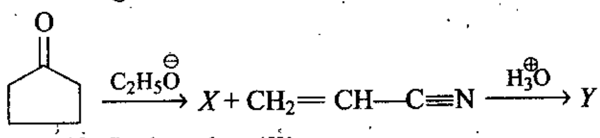
Identify structure of final product B :

(a) 

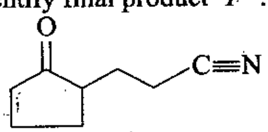
(b) 

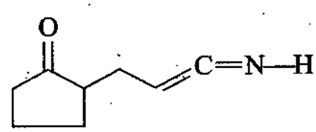
(c) 

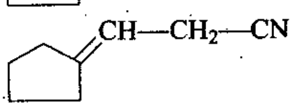
(d) None of these

69. 

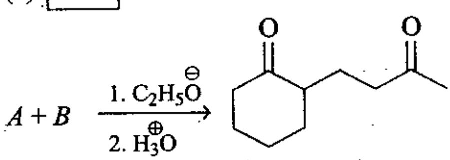
Identify final product 'Y' :

(a) 

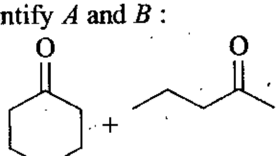
(b) 

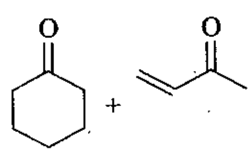
(c) 

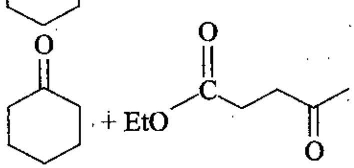
(d) None of these

70. 

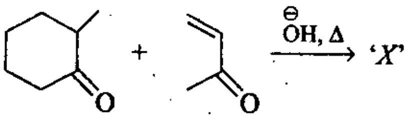
Identify A and B :

(a) 

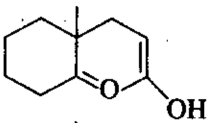
(b) 

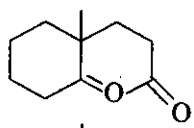
(c) 

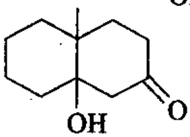
(d) None of these

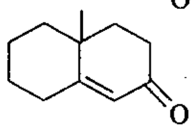
71. 

Find structure of 'X' :

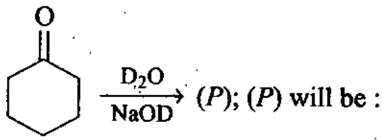
(a) 

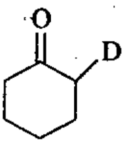
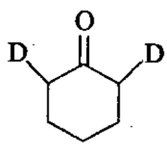
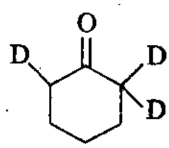
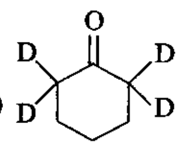
(b) 

(c) 

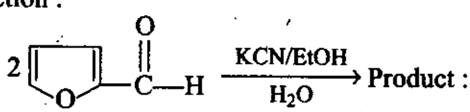
(d) 

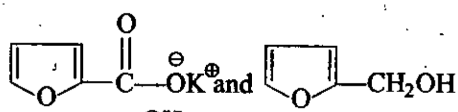
72. In the given reaction :

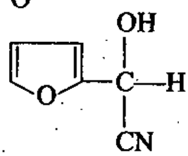


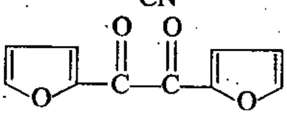
(a) 
(b) 
(c) 
(d) 

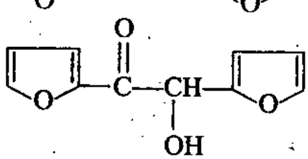
73. In the given reaction :

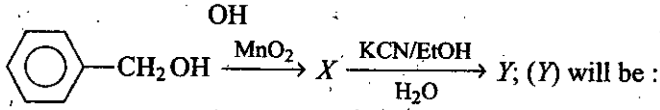


(a) 

(b) 2 

(c) 

(d) 

74. 

(a) $Ph-\overset{O}{\overset{\|}{C}}-\underset{OH}{\underset{|}{CH}}-Ph$

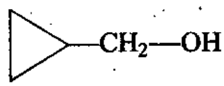
(b) $Ph-\overset{O}{\overset{\|}{C}}-\overset{\ominus}{O}K^{\oplus}$ and $Ph-CH_2OH$

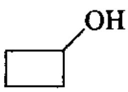
(c) $Ph-\overset{O}{\overset{\|}{C}}-H$

(d) $Ph-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-Ph$

75. Compound 'X' C_4H_8O which gives 2, 4-DNP derivative and negative iodoform test is :

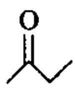
(a) 

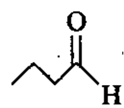
(b) 

(c) 

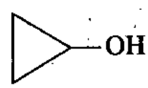
(d) $H_3C-\underset{CH_3}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-H$

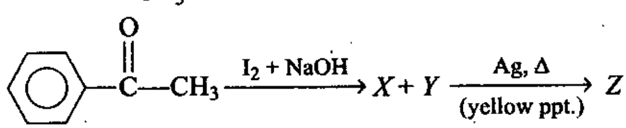
76. Compound 'X' C_4H_8O which gives 2, 4-DNP derivative and positive iodoform test is :

(a) 

(b) 

(c) $H_3C-\underset{CH_3}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-H$

(d) 

77. 

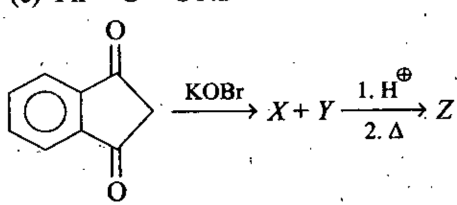
Identify final product 'Z' :

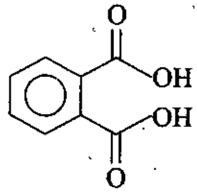
(a) CHI_3

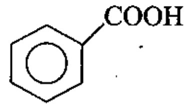
(b) $HC\equiv CH$

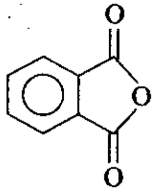
(c) $Ph-\overset{O}{\overset{\|}{C}}-\overset{\ominus}{O}Na^{\oplus}$

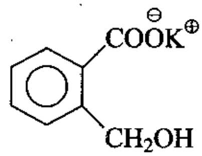
(d) $H_2C=CH_2$

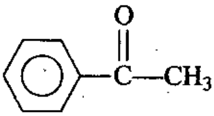
78.  'Z' will be :

(a) 

(b) 

(c) 

(d) 

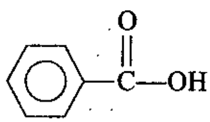
79.  $\xrightarrow{I_2 + Ca(OH)_2} \underset{\text{(yellow ppt.)}}{X + Y} \xrightarrow{\Delta} Z \xrightarrow[H_3\overset{\oplus}{O}]{CH_3MgBr} A$

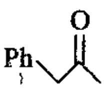
Identify final product 'A' :

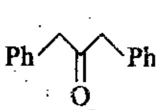
(a) CHI_3

(b) $Ph-\overset{OH}{\underset{CH_3}{C}}-Ph$

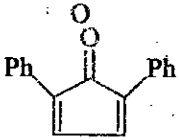
(c) $Ph-\overset{O}{\overset{\|}{C}}-Ph$

(d) 

80.  $\xrightarrow{Cl_2 + Ca(OH)_2} P + Q \xrightarrow{\Delta} R \xrightarrow[\Delta]{\begin{array}{c}CHO\\|\\CHO\end{array},\ \overset{\ominus}{O}H} S$; '$S$' will be :

(a) 

(b) $[Ph-CH_2-\overset{O}{\overset{\|}{C}}-O]_2Ca$

(c) 

(d) $\begin{array}{l}COO^{\ominus}\\|\\CH_2OH\end{array}$

81. $CH_3-\overset{O}{\overset{\|}{C}}-H \xrightarrow{CF_3CO_3H} X$; '$X$' will be :

(a) $CH_3-\overset{O}{\overset{\|}{C}}-OH$

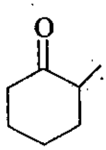
(b) $CH_3-O-\overset{O}{\overset{\|}{C}}-H$

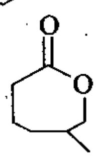
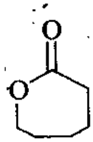
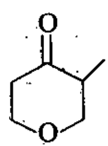
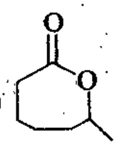
(c) $H-O-CH_2-\overset{\overset{O}{\|}}{C}-H$ (d) $H-\overset{\overset{O}{\|}}{C}-OH$

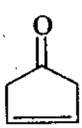
82. $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-\underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}-CH_3 \xrightarrow{PhCO_3H} A$; '$A$' will be :

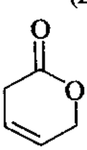
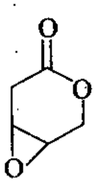
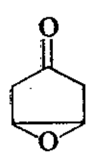
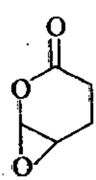
(a) $CH_3-CH_2-O-\overset{\overset{O}{\|}}{C}-\underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}-CH_3$ (b) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-O-\underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}-CH_3$

(c) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-\underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}-O-CH_3$ (d) none of these

83.  $\xrightarrow{\text{m-CPBA}}$ P; 'P' will be :

(a)  (b)  (c)  (d) 

84.  $\xrightarrow[\text{(Excess)}]{\text{m-CPBA}}$ Product; Find the product :

(a)  (b)  (c)  (d) 

85. $Ph-\underset{Ph}{\underset{|}{CH}}-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{CF_3CO_3H} X \xrightarrow{H^{\oplus}/H_2O} Y+Z$

Y and Z are respectively :

(a) $Ph-\underset{Ph}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-OH$ and CH_3OH (b) $Ph-\underset{Ph}{\underset{|}{CH}}-OH$ both

(c) CH_3OH both (d) none of these

86. $CH_3-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-Ph \xrightarrow{CH_3CO_3H}$ Product; Product will be :

(a) $CH_3-O-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-Ph$ (b) $CH_3-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-O-Ph$

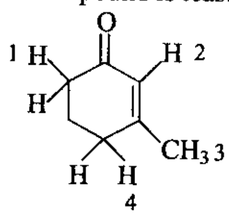
(c) $CH_3-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-Ph$ (d) $Ph-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-CH_2OH$

87. Which of the following compounds contains most acidic hydrogen?

(a) $H_3C-\overset{O}{\overset{\|}{C}}-H$ (b) $H_3C-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-CH_3$

(c) $H_3C-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-OCH_3$ (d) $H_3C-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-\ddot{N}H_2$

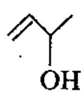
88. Which hydrogen of the given compound is least acidic in nature?

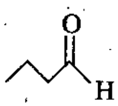


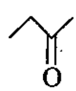
(a) 1 (b) 2 (c) 3 (d) 4

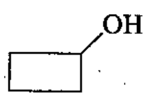
89. Which hydrogen of above compound (Question no. 88) is most acidic?
(a) 1 (b) 2 (c) 3 (d) 4

90. Compound $(X)\,C_4H_8O$ gives positive haloform test but does not give 2, 4-DNP derivative is :

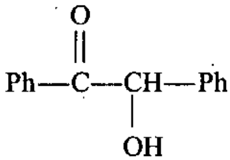
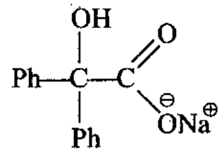
(a) 

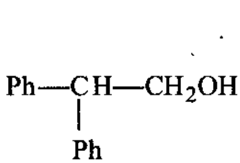
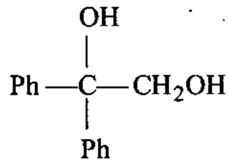
(b) 

(c) 

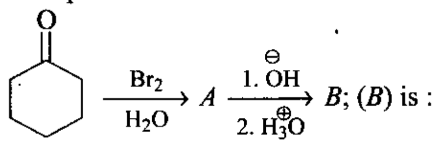
(d) 

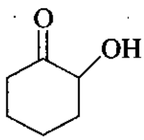
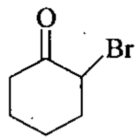
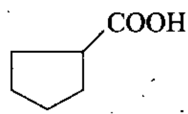
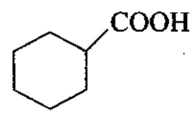
91. $Ph-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-Ph \xrightarrow{NaOH}$ Product, find structure of product :

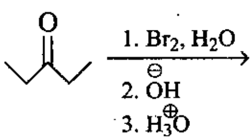
(a) 
(b) 

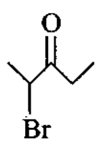
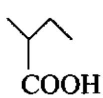
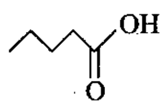
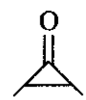
(c) 
(d) 

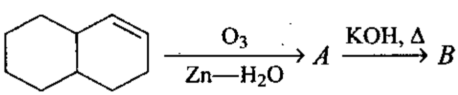
92. In the given reaction sequence



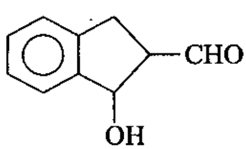
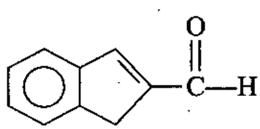
(a) 
(b) 
(c) 
(d) 

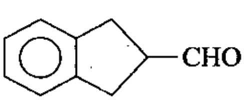
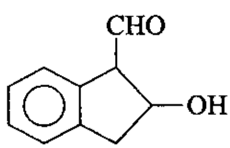
93. 

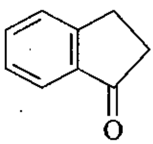
(a) 
(b) 
(c) 
(d) 

94. 

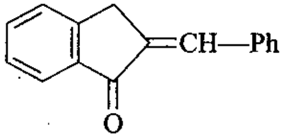
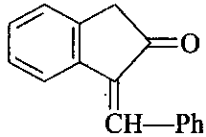
Compound B is :

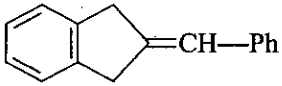
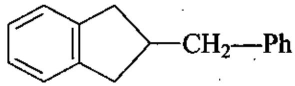
(a) 
(b) 

(c) 
(d) 

95.  $\xrightarrow[\text{2. Ph—C(=O)—H}]{\text{1. NaOH}} X \xrightarrow{NH_2—NH_2/\overset{\ominus}{O}H} Y$

Compound (Y) is :

(a)  (b) 

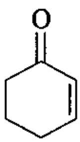
(c)  (d) 

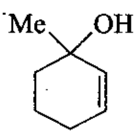
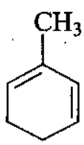
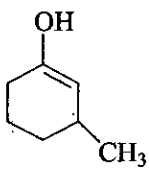
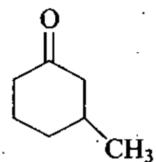
96. $CH_3—CH_2—\overset{\overset{O}{\|}}{C}—CH_2—Br \xrightarrow[\text{2. } H_3\overset{\oplus}{O}]{\text{1. } C_2H_5\overset{\ominus}{O}Na^{\oplus}} (X)$

(X) will be :

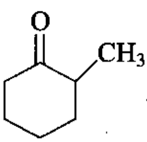
(a) $CH_3—CH_2—CH_2—\overset{\overset{O}{\|}}{C}—OC_2H_5$ (b) $CH_3—\underset{\underset{COOC_2H_5}{|}}{C}H—CH_3$

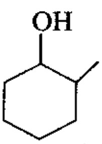
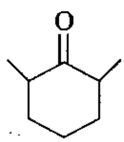
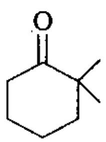
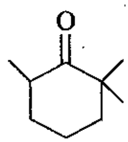
(c) Mixture of (a) and (b) (d) $CH_3CH_2—\overset{\overset{O}{\|}}{C}—OH$

97.  $\xrightarrow[H_3\overset{\oplus}{O}]{Me_2CuLi}$ Product; Product will be :

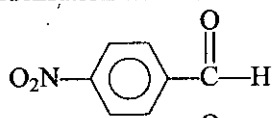
(a)  (b)  (c)  (d) 

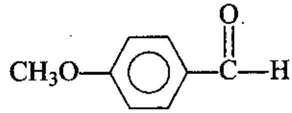
98. In the given reaction

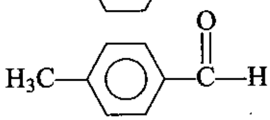
 $\xrightarrow[\text{2. } CH_3I]{\text{1. NaH, THF}}$ (X); X will be :

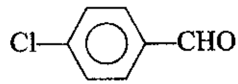
(a)  (b)  (c)  (d) 

99. Which of the following compounds would be most reactive for Perkin condensation with acetic anhydride?

(a) 

(b) 

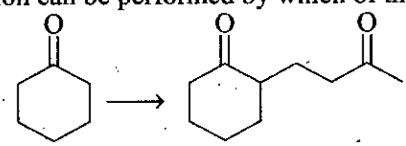
(c) 

(d) 

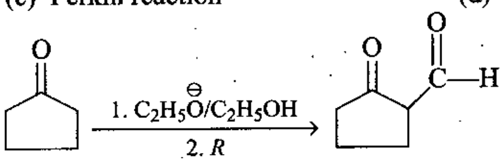
100. Cinnamic acid from benzaldehyde would be prepared by which of the following reactions?

(a) Perkin reaction
(b) Reformatsky reaction
(c) Knoevenagel condensation
(d) All of these

101. The given conversion can be performed by which of the following reactions?

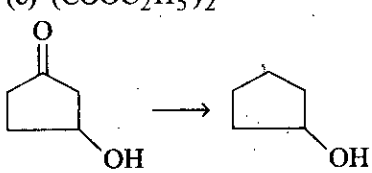


(a) Aldol condensation
(b) Michael addition
(c) Perkin reaction
(d) Reimer-Tiemann reaction

102. 

(R) would be :

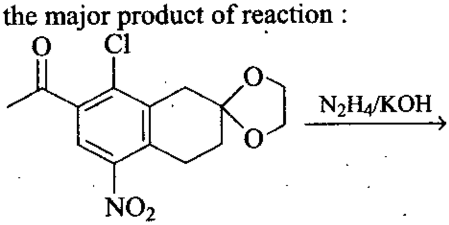
(a) HCHO
(b) $H_3C-\overset{O}{\overset{\|}{C}}-H$
(c) $(COOC_2H_5)_2$
(d) $H-\overset{O}{\overset{\|}{C}}-OC_2H_5$

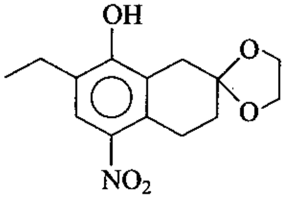
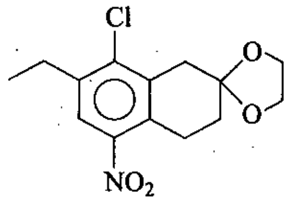
103. 

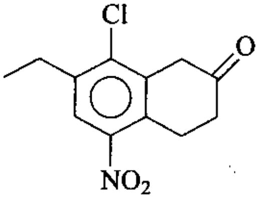
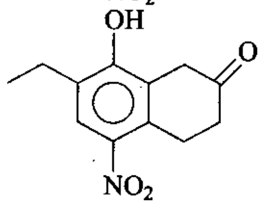
Above conversion can be achieved by :

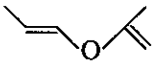
(a) Wolff-Kishner reduction
(b) Clemmensen reduction
(c) $LiAlH_4$
(d) $NaBH_4$

104. Predict the major product of reaction :

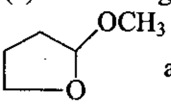
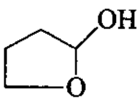
 (A); Product (A) is :

(a)  (b) 

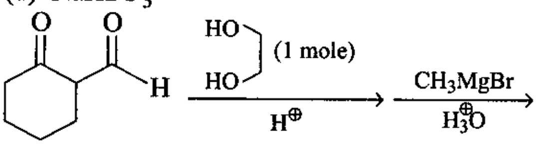
(c)  (d) 

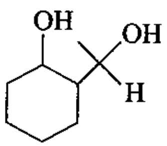
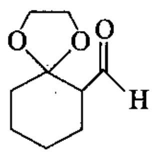
105.  $\xrightarrow{H_3\overset{\oplus}{O}}$ $A + B$; Compounds A and B can be differentiated by :

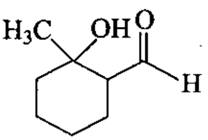
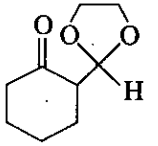
(a) 2, 4-DNP (b) Fehling solution
(c) Lucas reagent (d) $NaHSO_3$

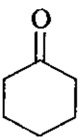
106.  and , these compounds can be differentiated by :

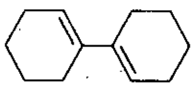
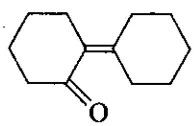
(a) 2, 4-DNP
(b) Tollen's reagent
(c) Lucas reagent
(d) $NaHSO_3$

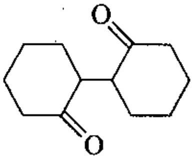
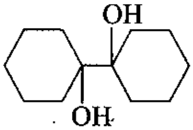
107.  Product :

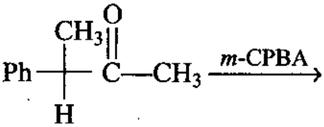
(a)  (b) 

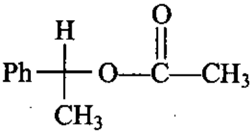
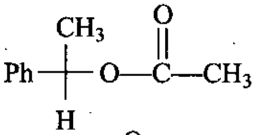
(c)  (d) 

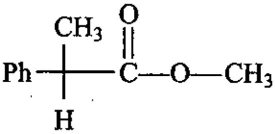
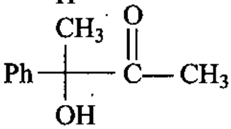
108.  $\xrightarrow[H_2O,\ \Delta]{Mg\text{—}Hg,}$ X; Find out final product (X) :

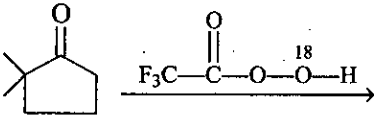
(a)  (b) 

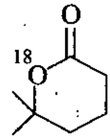
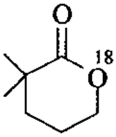
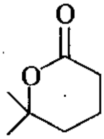
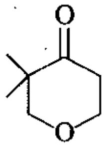
(c)    (d) 

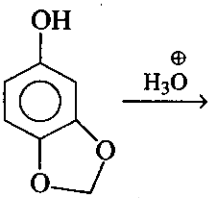
109.  (X) ; find major product (X) :

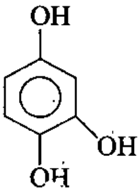
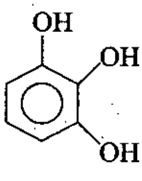
(a)    (b) 

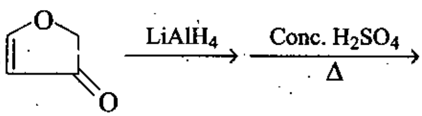
(c)    (d) 

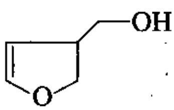
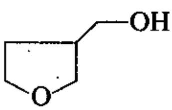
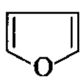
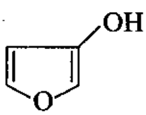
110.  Major product (X) :

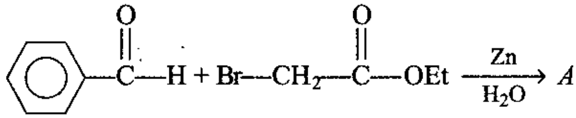
(a)    (b)    (c)    (d) 

111.  Product :

(a)    (b)    (c) $H-\overset{\overset{O}{\|}}{C}-H$ (d) Both (a) and (c)

112.  (X); Product (X) of reaction is :

(a)    (b)    (c)    (d) 

113. 

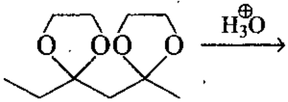
Product (A) of the above reaction is :

(a) $Ph-CH(OH)-CH_2-C(=O)-OH$

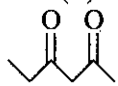
(b) $Ph-CH(OH)-CH_2-C(=O)-OEt$

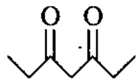
(c) $Ph-CH=CH-CH_2-OH$

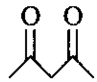
(d) $Ph-CH=CH-CH_3$

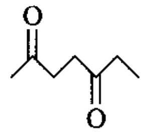
114.  A + 2 Glycerol

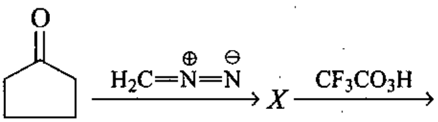
Product (A) of the reaction is :

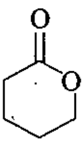
(a) 

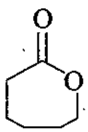
(b) 

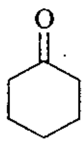
(c) 

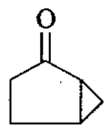
(d) 

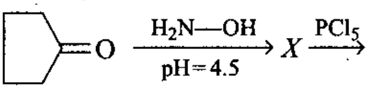
115.  Y; Product 'Y' is :

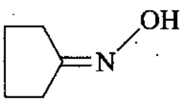
(a) 

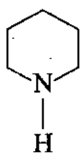
(b) 

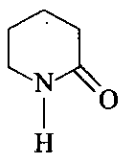
(c) 

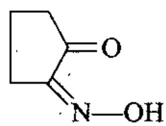
(d) 

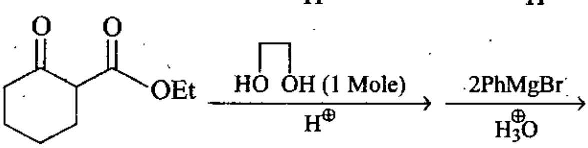
116.  Y; Final product Y is :

(a) 

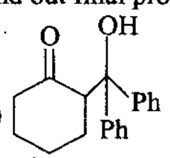
(b) 

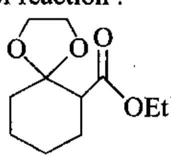
(c) 

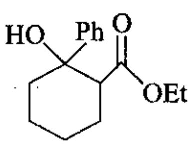
(d) 

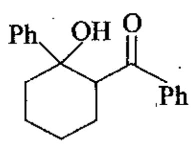
117. 

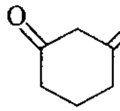
Find out final product of reaction :

(a) 

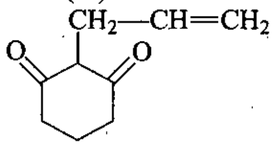
(b) 

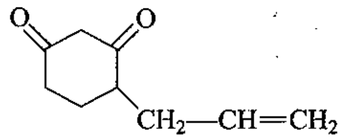
(c) 

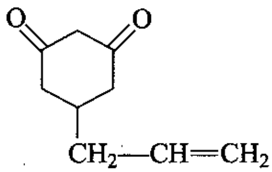
(d) 

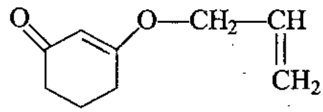
118.  $+ CH_2{=}CH{-}CH_2{-}Br \xrightarrow{KOH}$ Major product (X)

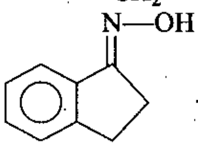
Find out (X) of the reaction :

(a) 

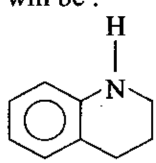
(b) 

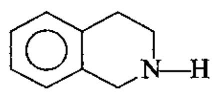
(c) 

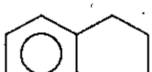
(d) 

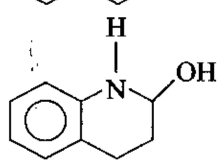
119.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4} \xrightarrow{LiAlH_4} (Y)$

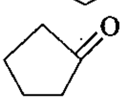
'Y' will be :

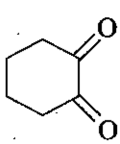
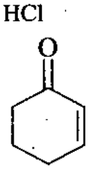
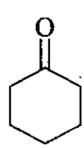
(a) 

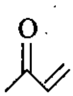
(b) 

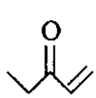
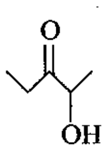
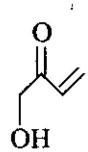
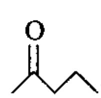
(c) 

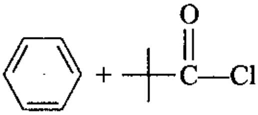
(d) 

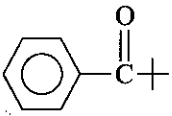
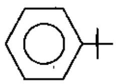
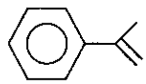
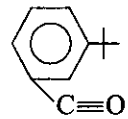
120.  $\xrightarrow[\text{2. } LiAlH_4 \quad \text{3. } NaNO_2 + HCl]{\text{1. HCN}}$ (A); Product 'A' will be :

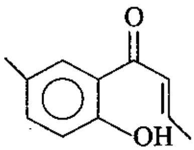
(a)  (b)  (c)  (d) none of these

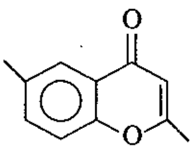
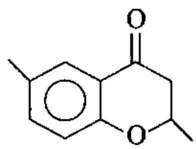
121.  $\xrightarrow[H_3O^{\oplus}]{Me_2CuLi}$ Product :

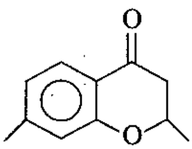
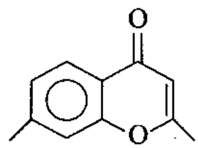
(a)  (b)  (c)  (d) 

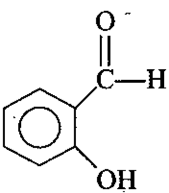
122.  $\xrightarrow[\Delta]{AlCl_3}$ (*X*); *X* will be :

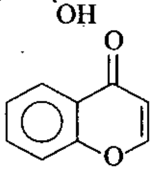
(a)  (b)  (c)  (d) 

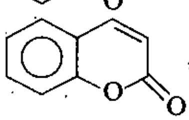
123.  $\xrightarrow{\overset{\ominus\oplus}{MeONa}/MeOH}$ (*A*); find out major product (*A*) :

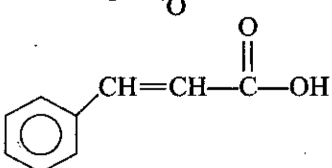
(a)  (b) 

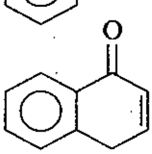
(c)  (d) 

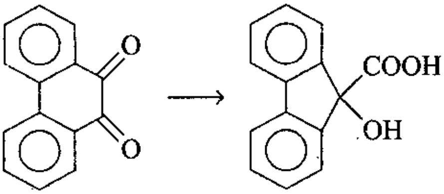
124.  + $(CH_3COO)_2O$ $\xrightarrow{Ac\overset{\ominus}{O}Na^{\oplus}}$ $\xrightarrow[\Delta]{H^{\oplus}/H_2O}$ Product :

(a)  , Aldol condensation

(b)  , Perkin condensation

(c)  , Claisen condensation

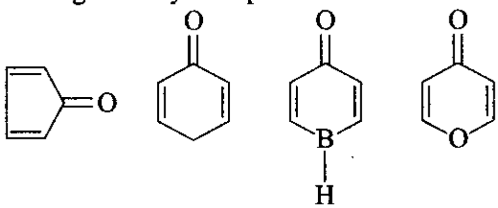
(d)  , Cannizzaro reaction

125. 

Reagents required for above conversion is :

(a) $LiAlH_4, H^{\oplus}, \Delta$ (b) $\overset{\ominus}{O}H/\Delta, H^{\oplus}$ (c) $H^{\oplus}, \overset{\ominus}{O}H/\Delta$ (d) $NaBH_4, H^{\oplus}$

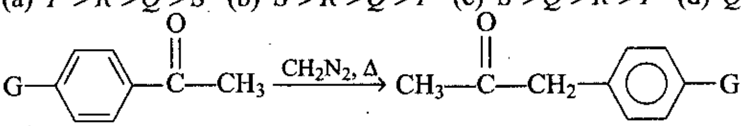
126. Consider the following carbonyl compounds



(*P*) (*Q*) (*R*) (*S*)

Which of the following is correct decreasing order of their dipole moment?

(a) $P > R > Q > S$ (b) $S > R > Q > P$ (c) $S > Q > R > P$ (d) $Q > S > R > P$

127. 

Which of the following is correct decreasing rate of homologoation with various G ?

(a) $-\ddot{\underset{\cdot\cdot}{O}}Me > -CH_3 > -NO_2 > -H > -F$

(b) $-NO_2 > -F > -H > -CH_3 > -OCH_3$

(c) $-OMe > -CH_3 > -H > -F > -NO_2$

(d) $-OMe > -NO_2 > -H > -F > -CH_2$

128. $CH_3-\overset{O}{\overset{\|}{C}}-H$ react most readily with :

(a) H_2N-NH_2 (b) $H_2N-NH-\underset{O}{\underset{\|}{C}}-NH_2$

(c) $Ph-NH-NH_2$ (d) H_2N-OH

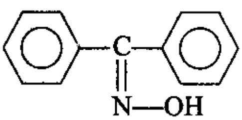
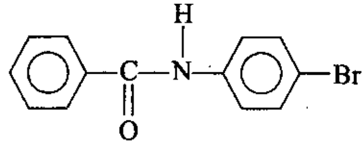
129. The possible number of stereoisomers of the product of following reaction would be :

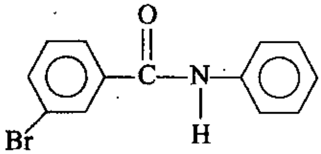
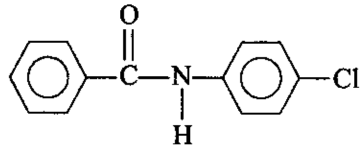
$$Ph-CH=CH-\underset{CH_3}{\underset{|}{C}H}-\underset{H}{\underset{|}{C}}=O \xrightarrow[pH=4.5]{H_2N-OH} +$$

(a) 2 (b) 6 (c) 8 (d) 4

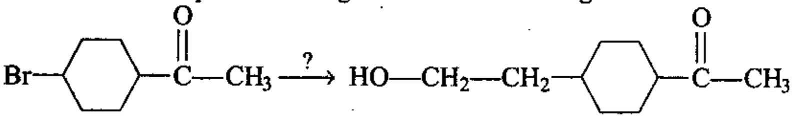
130. The final product (C) of the following reaction would be :

$$C_6H_5-\underset{O}{\underset{\|}{C}}-C_6H_5 \xrightarrow{H_2N-OH} A \xrightarrow{PCl_5} B \xrightarrow{Br_2/Fe} C+$$

(a)  (b) 

(c)  (d) 

131. Give the correct sequence of reagents for the following conversion :



(a) $\xrightarrow[H_2SO_4]{CH_3OH\ (excess)}$ $\xrightarrow{Mg/ether}$  $\xrightarrow{H_2O/H_3\overset{\oplus}{O}}$

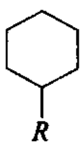
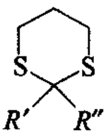
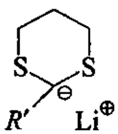
(b) $\xrightarrow{Mg/ether}$  $\xrightarrow{H_2O/H_3\overset{\oplus}{O}}$ $\xrightarrow{CH_3OH/H^{\oplus}}$

(c) $\xrightarrow[^{\ominus}OH]{CH_3OH\ (excess)}$ $\xrightarrow{Mg/ether}$  $\xrightarrow{H_2O/H_3\overset{\oplus}{O}}$

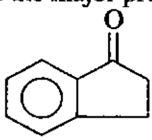
(d) $\xrightarrow{H_2O/H_3\overset{\oplus}{O}}$ $\xrightarrow[H_2SO_4]{CH_3OH\ (excess)}$ $\xrightarrow{Mg/ether}$ 

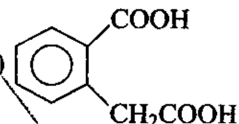
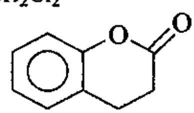
132.  $\xrightarrow{\overset{\ominus\ \oplus}{BuLi}} P \xrightarrow{R-X} Q \xrightarrow{BuLi} R \xrightarrow{R''-X} S \xrightarrow[H_2O]{HgCl_2} T$

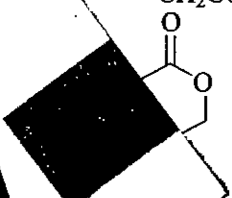
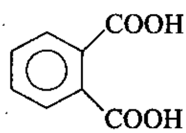
The final product '*T*' is :

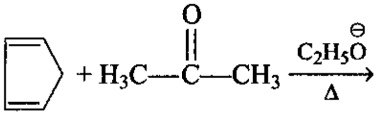
(a)  (b)  (c)  (d) $R'-\overset{O}{\overset{\|}{C}}-R''$

133. In the following reaction the major product formed is :

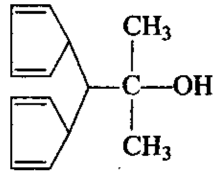
 $\xrightarrow[CH_2Cl_2]{PhCO_3H}$

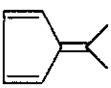
)  (b) 

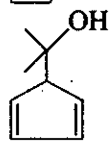
 (d) 

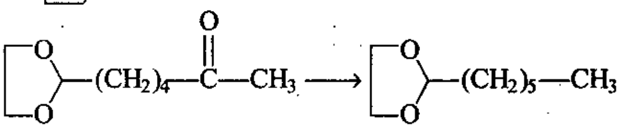
134.  'X'; 'X' is :

(a) 

(b) 

(c) 

(d) 

135. 

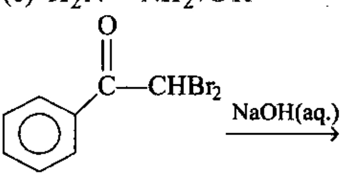
Which of the following reagents is suitable for above conversion?

(a) Zn-Hg/HCl

(b) $LiAlH_4$

(c) $H_2N{-}NH_2/\overset{\ominus}{O}H$

(d) $NaBH_4$

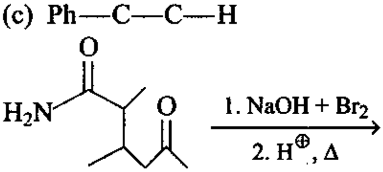
136.  Product :

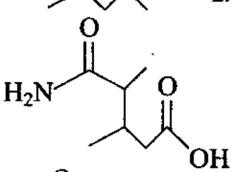
(a) $Br_2CH{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}\overset{\ominus}{O}$

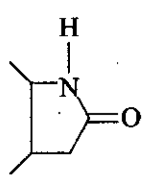
(b) $Ph{-}\overset{\overset{\displaystyle OH}{|}}{C}H{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}\overset{\ominus}{O}$

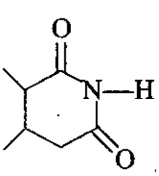
(c) $Ph{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}H$

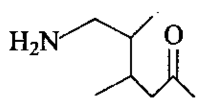
(d) $Ph{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}\overset{\ominus}{O} + CH_2Br_2$

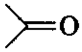
137.  Product :

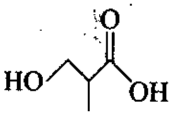
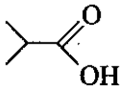
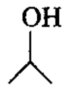
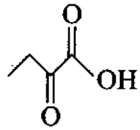
(a) 

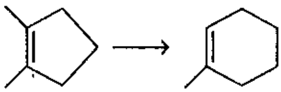
(b) 

(c) 

(d) 

138.  $\xrightarrow{HCN}\xrightarrow{H_3\overset{\oplus}{O}}\xrightarrow[\Delta]{H_2SO_4}\xrightarrow[H_2O_2/\overset{\ominus}{O}H]{B_2H_6}$ Product :

(a)  (b)  (c)  (d) 

139. 

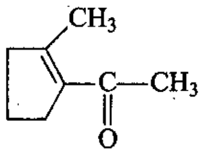
Which of the following sets of reagents is the most appropriate to perform the above conversion ?

(a) $HIO_4; \overset{\ominus}{O}H$; Zn-Hg/HCl

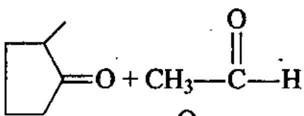
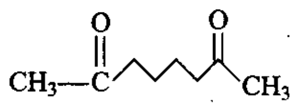
(b) Cold $KMnO_4$; $Pb(OAc)_4$; $\overset{\ominus}{O}H$; Li/NH_3

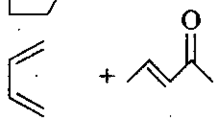
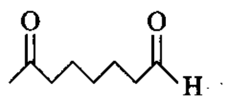
(c) O_3/Me_2S; $\overset{\ominus}{O}H$; Li/NH_3

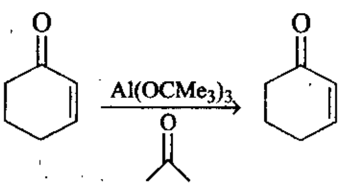
(d) $KMnO_4$; $\overset{\ominus}{O}H/\Delta$; $N_2H_4/\overset{\ominus}{O}H, \Delta$

140. Reactant $\xrightarrow{\overset{\ominus}{O}H}$ 

The suitable reactant is :

(a)  (b) 

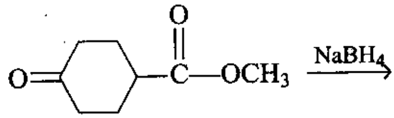
(c)  (d) 

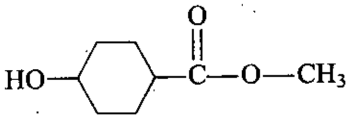
141. 

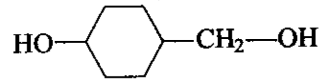
The above reaction is known as :

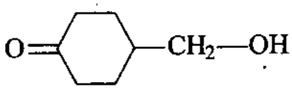
(a) Kolbe reaction
(b) Oppenauer oxidation
(c) MPV reduction
(d) Tischenko reaction

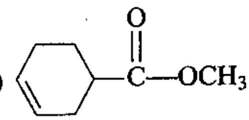
142. The product formed in the reaction is :



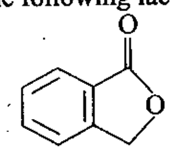
(a) 

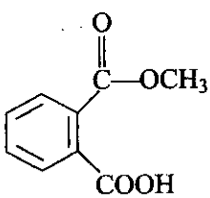
(b) 

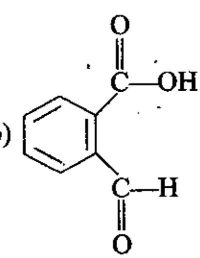
(c) 

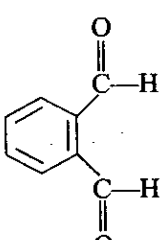
(d) 

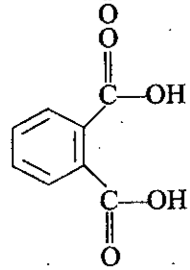
143. Which of the following reactants on reaction with conc. NaOH followed by acidification gives the following lactone as the only product?

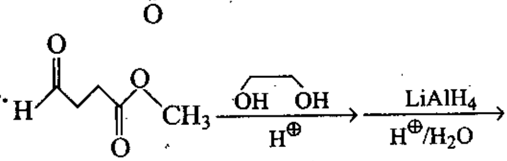


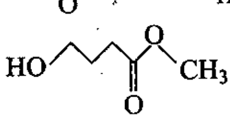
(a) 

(b) 

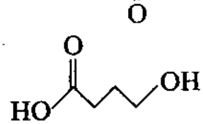
(c) 

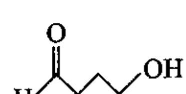
(d) 

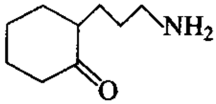
144.  Product :

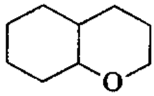
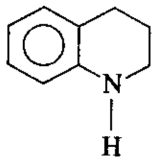
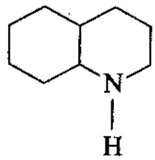
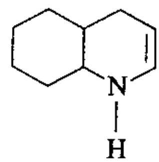
(a) 

(b) 

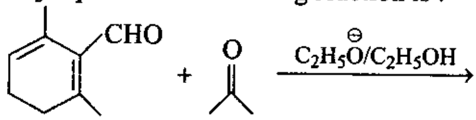
(c) 

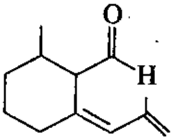
(d) 

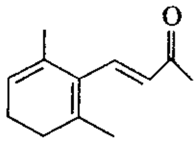
145.  $\xrightarrow[\text{Raney Ni}]{H_2}$ Product

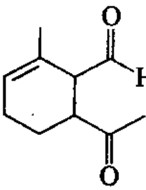
(a)  (b)  (c)  (d) 

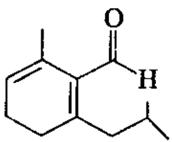
146. The structure of major product of following reaction is :



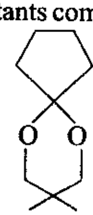
(a) 

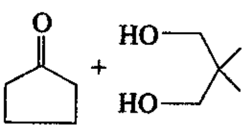
(b) 

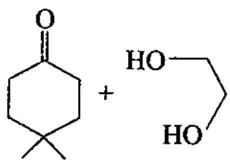
(c) 

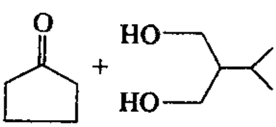
(d) 

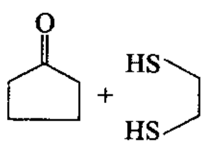
147. Which of these pair of reactants compound may be used to make this given acetal?



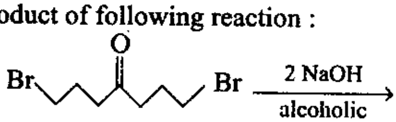
(a) 

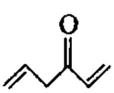
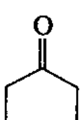
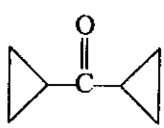
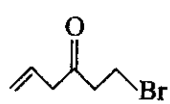
(b) 

(c) 

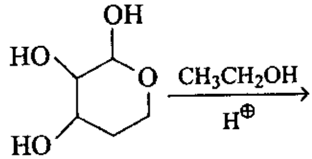
(d) 

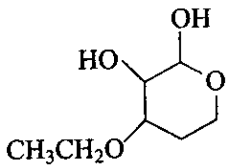
148. Identify the major product of following reaction :

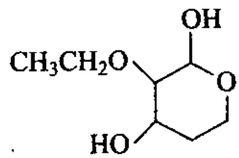


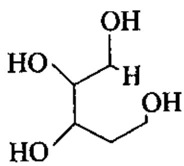
(a)  (b)  (c)  (d) 

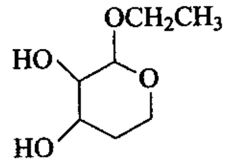
149. Find the major product of reaction :



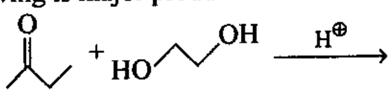
(a) 

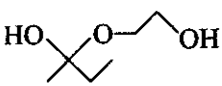
(b) 

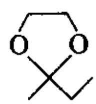
(c) 

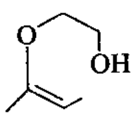
(d) 

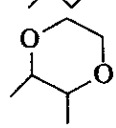
150. Which of the following is major product of reaction?



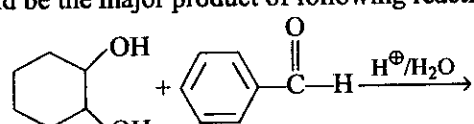
(a) 

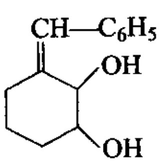
(b) 

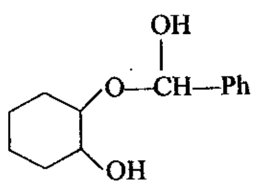
(c) 

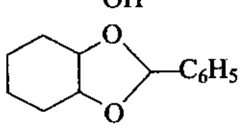
(d) 

151. What would be the major product of following reaction?



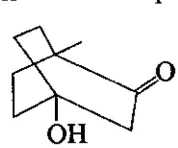
(a) 

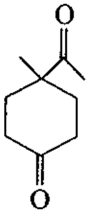
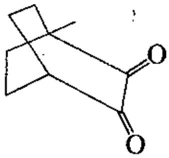
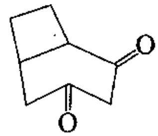
(b) 

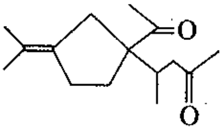
(c) 

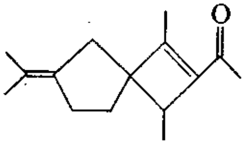
(d) No reaction

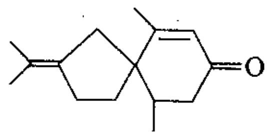
152. What dicarbonyl compound is needed to prepare the following compound by aldol reaction?

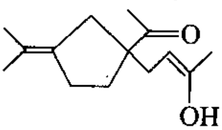


(a)  (b)  (c)  (d) Cannot be prepared

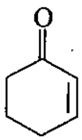
153.  $\xrightarrow{\text{NaOH, }\Delta}$ Product :

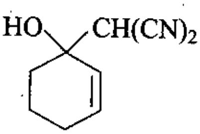
(a) 

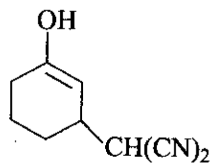
(b) 

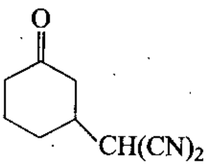
(c) 

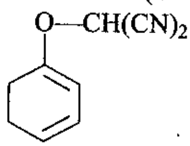
(d) No reaction

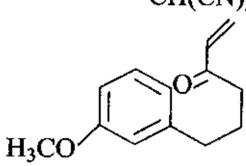
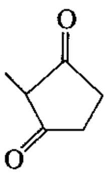
154.  + $H_2C(CN)_2$ $\xrightarrow[C_2H_5OH]{C_2H_5O^{\ominus}}$ Product :

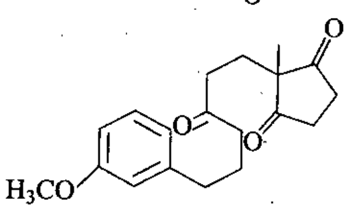
(a) 

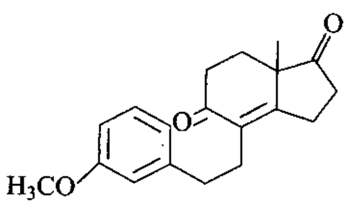
(b) 

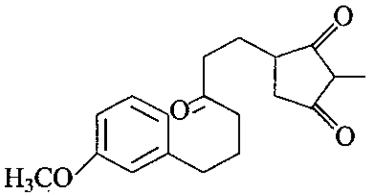
(c) 

(b) 

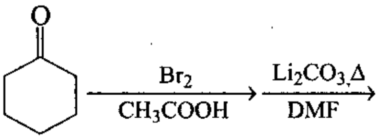
155.  +  $\xrightarrow[CH_3OH]{\overset{\ominus}{O}H,\ \Delta}$

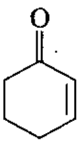
(a) 

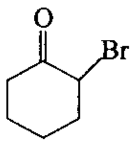
(b) 

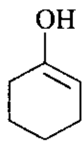
(c) 

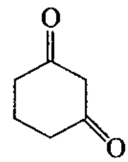
(d) None of these

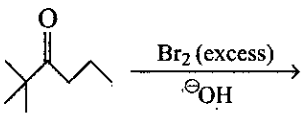
156. 

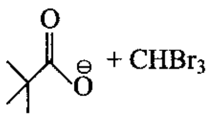
(a) 

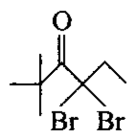
(b) 

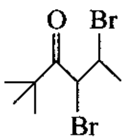
(c) 

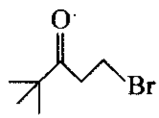
(d) 

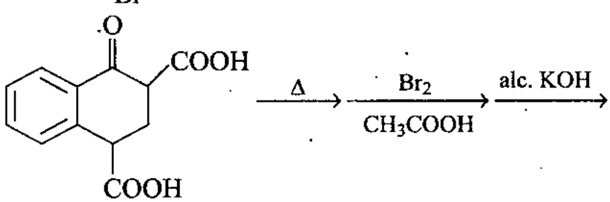
157. 

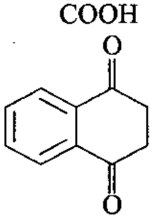
(a) 

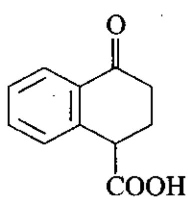
(b) 

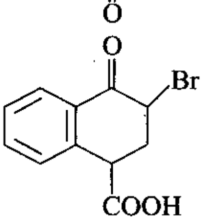
(c) 

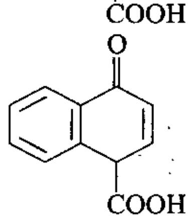
(d) 

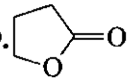
158. 

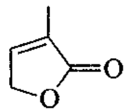
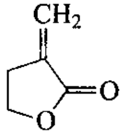
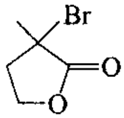
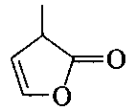
(a) 

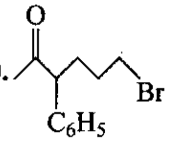
(b) 

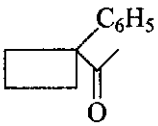
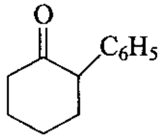
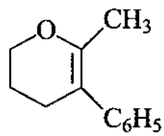
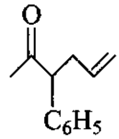
(c) 

(d) 

159.  $\xrightarrow{C_2H_5\overset{\ominus}{O}}\ \xrightarrow{CH_3I}\ \xrightarrow[CH_3COOH]{Br_2}\ \xrightarrow{(CH_3)_3C-\overset{\ominus\oplus}{OK}}$ Product :

(a)  (b)  (c)  (d) 

160.  $\xrightarrow[DMSO]{CH_3CH_2\overset{\ominus}{O}}$ Major product :

(a)  (b)  (c)  (d) 

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which of the following do not react with Fehling solution?

   (a) CH_3CHO (b) Ph—CHO (c) Glucose (d) 

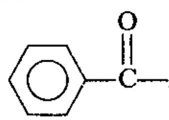
2. Which of the following form Schiff's base with CH_3—NH_2?

   (a) $H_3C-\overset{\overset{\large O}{\|}}{C}-H$ (b) $H_5C_6-\overset{\overset{\large O}{\|}}{C}-H$

   (c) CH_3-CH_2-OH (d) $H-\overset{\overset{\large O}{\|}}{C}-OH$

3. $H-\overset{\overset{\large O}{\|}}{C}-OH$ and $H_3C-\overset{\overset{\large O}{\|}}{C}-OH$ can be distinguished by :

   (a) $NaHCO_3$ (b) H_2SO_4
   (c) $AgNO_3/NH_4OH$ (d) Fehling solution

4. $H_3C-\overset{\overset{\large O}{\|}}{C}-H$ and —H can be distinguished by :

   (a) Tollen's reagent (b) Fehling solution
   (c) Benedict solution (d) H_2N—OH

5. Which of the following give N-substituted amide from ketoxime?

   (a) PCl_5 (b) SO_3 (c) BF_3 (d) $\ddot{N}H_3$

6. Acetaldehyde can be obtained from which of the following reactions?

(a) $CH_3CH_2OH \xrightarrow{Cu/\Delta}$

(b) $CH_3-\overset{\overset{\large O}{\|}}{C}-Cl \xrightarrow[H_2,\,\Delta]{Pd\text{-}BaSO_4}$

(c) $(CH_3COO)_2Ca + (HCOO)_2\,Ca \xrightarrow{\Delta}$

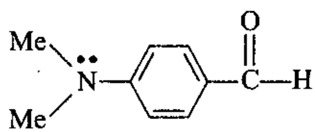
(d) $H_3C-CH=\underset{\underset{\large CH_3}{|}}{C}-Ph \xrightarrow[Zn\text{-}H_2O]{O_3}$

7. Which of the following do not give Cannizzaro reaction?

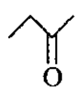
(a) $Cl_3C-\overset{\overset{\large O}{\|}}{C}-H$

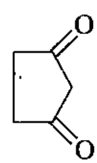
(b) $H-\underset{\underset{\large O}{\|}}{C}-H$

(c) $Ph-\underset{\underset{\large O}{\|}}{C}-H$

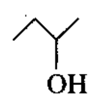
(d) 

8. Which of the following yield yellow precipitate on reaction with I_2 and NaOH?

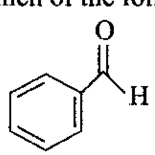
(a) 

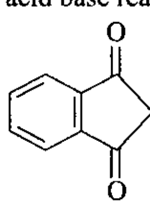
(b) 

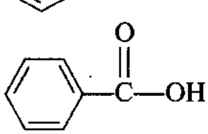
(c) $Ph-\underset{\underset{\large Ph}{|}}{\overset{\overset{\large Ph}{|}}{C}}-\overset{\overset{\large O}{\|}}{C}-CH_3$

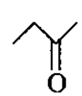
(d) 

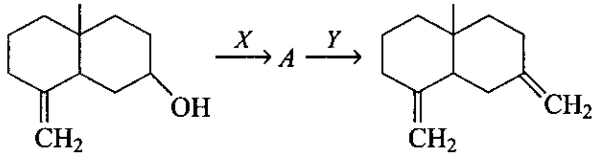
9. Which of the following compounds exhibit acid base reaction with NaOH?

(a) 

(b) 

(c) 

(d) 

10. 

In the reaction X and Y may be :

(a) pcc and $Ph_3P{=}CH_2$
(b) PDC and $Ph_3P{=}CH_2$
(c) pcc and $Ph_3P{=}CH{-}CH_3$
(d) pcc and $Me_2S{=}CH_2$

11. The synthesis of $Ph{-}\underset{C_2H_5}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}{-}OH$ can be achieved by :

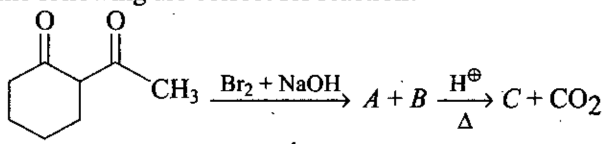
(a) $PhMgBr + CH_3{-}\overset{O}{\overset{\|}{C}}{-}C_2H_5 \xrightarrow{H^{\oplus}/H_2O}$

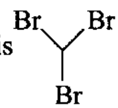
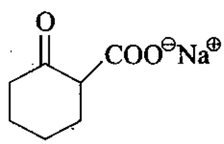
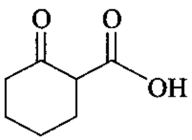
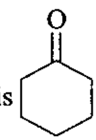
(b) $C_2H_5MgBr + Ph{-}\overset{O}{\overset{\|}{C}}{-}CH_3 \xrightarrow{H^{\oplus}/H_2O}$

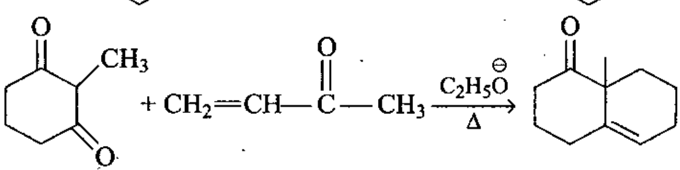
(c) $CH_3MgBr + Ph{-}\overset{O}{\overset{\|}{C}}{-}CH_2CH_3 \xrightarrow{H^{\oplus}/H_2O}$

(d) $PhMgBr + CH_3{-}\overset{O}{\overset{\|}{C}}{-}Cl \xrightarrow{H^{\oplus}/H_2O}$

12. Which of the following are correct for reaction?

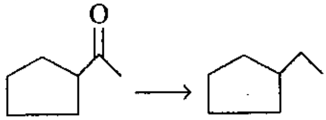


(a) A is 
(b) B is 
(c) C is 
(d) C is 

13. 

Select the reactions involved in the above reaction :

(a) Michael Addition
(b) Aldol Condensation
(c) Dehydration
(d) Perkin Condensation

14. 

Which of the following reagents can perform this conversion successfully?

(a) HS SH, H_2 and Ni
(b) Zn-Hg/HCl
(c) Mg.THF/H_2O
(d) $N_2H_4/\overset{\ominus}{O}H$

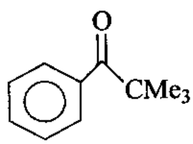
15. Select the correct combination :

(a) $H_3C{-}\overset{\overset{O}{\|}}{C}{-}H \xrightarrow[\Delta]{\overset{\ominus}{O}H} H_3C{-}CH{=}CH{-}\overset{\overset{O}{\|}}{C}{-}H$

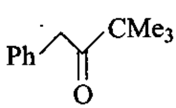
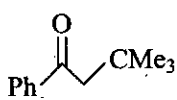
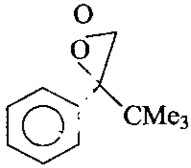
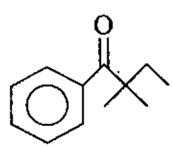
(b) $Ph{-}\overset{\overset{O}{\|}}{C}{-}H \xrightarrow{KOH} Ph{-}\overset{\overset{O}{\|}}{C}{-}\overset{\ominus}{O}K^{\oplus} + Ph{-}CH_2{-}OH$

(c) $Ph{-}\overset{\overset{O}{\|}}{C}{-}H \xrightarrow{Al(OEt)_3} Ph{-}\overset{\overset{O}{\|}}{C}{-}O{-}CH_2{-}Ph$

(d) $H{-}\overset{\overset{O}{\|}}{C}{-}H \xrightarrow{NaOH} H{-}\overset{\overset{O}{\|}}{C}{-}OH + CH_3OH$

16.  $\xrightarrow{CH_2N_2,\ \Delta}$ Products

The possible products are :

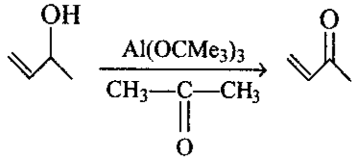
(a) 
(b) 
(c) 
(d) 

17. Which of the following reactions involve hydride ion transfer?

(a) $2H{-}\overset{\overset{O}{\|}}{C}{-}H \xrightarrow{\overset{\ominus}{O}H} H{-}\overset{\overset{O}{\|}}{C}{-}\overset{\ominus}{O} + CH_3{-}OH$

(b) $2H_3C-\overset{\overset{\Large O}{\|}}{C}-H \xrightarrow[\Delta]{\overset{\ominus}{O}H} H_3C-CH=CH-\overset{\overset{\Large O}{\|}}{C}-H$

(c) $2H_3C-\overset{\overset{\Large O}{\|}}{C}-H \xrightarrow{Al(OEt)_3} CH_3-\overset{\overset{\Large O}{\|}}{C}-O-CH_2CH_3$

(d) 

18. Which of the following statements are correct?

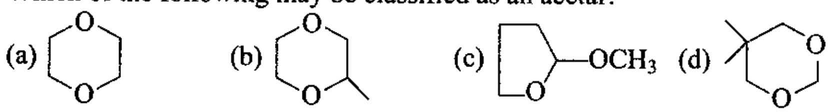
(a) Carbonyl compounds give nucleophilic addition reaction while alkenes give electrophilic addition reaction

(b) $\rangle C=O$ bond has larger dipole than $\rangle C=C\langle$

(c) Aldehyde and terminal alkyne both react with Tollen's reagent

(d) Aldehydes and ketones can be distinguished by 2, 4-DNP

19. Which of the following may be classified as an acetal?

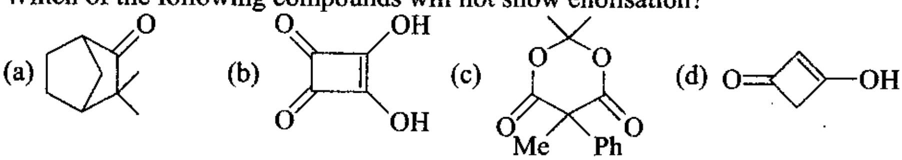


20. Which of the following pairs are not correctly matched?

(a) $\rangle C=O \xrightarrow[HCl]{Zn\text{-}Hg} \rangle CH_2$ (b) $\rangle C=O \xrightarrow{N_2H_4/\overset{\ominus}{O}H} \rangle CH-OH$

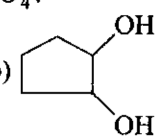
(c) $\underset{Cl}{\rangle} C=O \xrightarrow{H_2,\ Pd\text{-}BaSO_4} \underset{H}{\rangle} C=O$ (d) $-C\equiv N \xrightarrow{Sn + HCl} -\overset{\overset{\Large O}{\|}}{C}-NH_2$

21. Which of the following compounds will not show enolisation?



22. Which compounds will be oxidised by HIO_4?

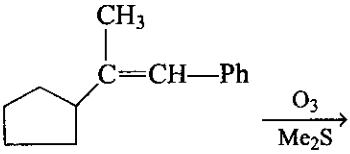
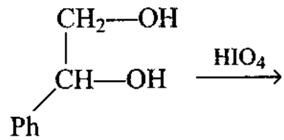
(a) $CH_3-\underset{OH}{\underset{|}{CH}}-\underset{O}{\underset{\|}{C}}-H$

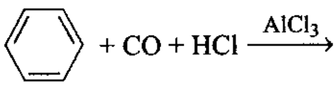
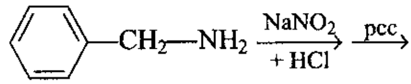
(b) 

(c) $CH_3-\overset{OH}{\overset{|}{CH}}-CH_2-CH_3$

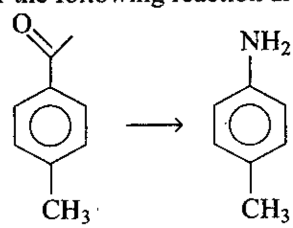
(d) $\begin{array}{c} CH_2-OH \\ | \\ C=O \\ | \\ CH_2OH \end{array}$

23. Which of the following reactions can produce benzaldehyde as major product?

(a)  (b) 

(c)  (d) 

24. The suitable reagents for the following reaction are :



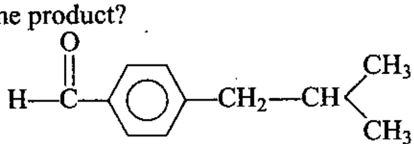
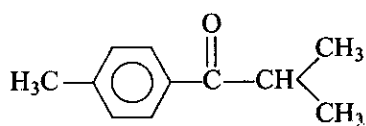
(a) $\xrightarrow{PCl_5} \xrightarrow{NaOH} \xrightarrow{\Delta}$

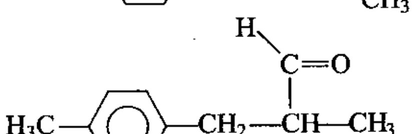
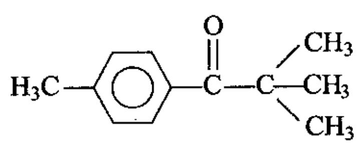
(b) $\xrightarrow{I_2 + NaOH} \xrightarrow{H^{\oplus}} \xrightarrow[\Delta]{NH_3} \xrightarrow{Br_2 + KOH}$

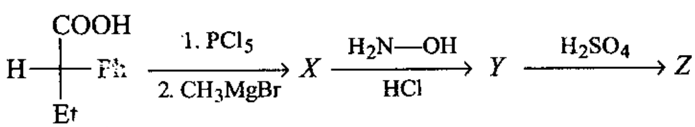
(c) $\xrightarrow{NH_2OH} \xrightarrow{PCl_5} \xrightarrow[\Delta]{\text{dil. NaOH}} \xrightarrow[\Delta]{N_3H}$

(d) $\xrightarrow{H_2N—OH} \xrightarrow{\Delta}$

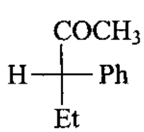
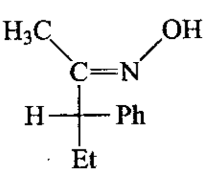
25. Which of these carbonyl compounds on reduction with Zn-Hg/HCl will give the same product?

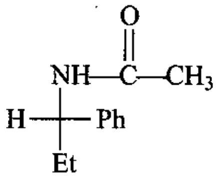
(a)  (b) 

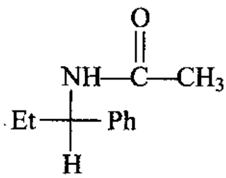
(c)  (d) 

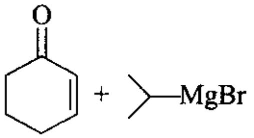
26. 

X, Y and Z are :

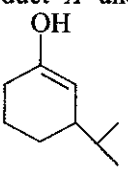
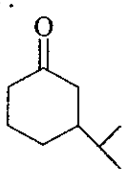
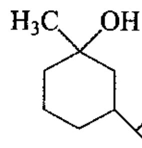
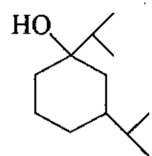
(a)  (b) 

(c) 

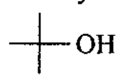
(d) 

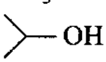
27.  $\xrightarrow{H_3\overset{\oplus}{O}} A \xrightarrow{H_3CMgBr} B \xrightarrow{H_3\overset{\oplus}{O}} C$

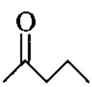
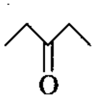
Product '*A*' and '*C*' are :

(a)  (b)  (c)  (d) 

28. Which of the following alcohols can be oxidised by $K_2Cr_2O_7$?

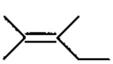
(a) $CH_3—CH_2—OH$ (b) 

(c)  (d) $H_2C{=}CH—CH_2—OH$

29.  and  can be distinguished by :

(a) $I_2 + NaOH$ (b) $NaSO_3H$ (c) NaCN/HCl (d) 2, 4 - DNP

30. Which of the following reactions will produce aldehyde?

(a)  $\xrightarrow[Zn\text{-}H_2O]{O_3}$ (b) $H_3C—CH{=}CH_2 \xrightarrow[CO_2(CO)_8]{CO + H_2}$

(c) $H_3C—C{\equiv}CH \xrightarrow[\overset{\ominus}{O}H/H_2O]{B_2H_6}$ (d) $H_3C—C{\equiv}CH \xrightarrow{Hg^{+2}, H_2SO_4}$

31. In the given reaction :

$$Ph—\underset{\underset{O}{\|}}{C}—CH_3 \xrightarrow[H^{\oplus}]{H_2N—OH} (X) \xrightarrow[\Delta]{PCl_5} (Y)$$

Y will be :

(a) $Ph—\underset{\underset{O}{\|}}{C}—NH—CH_3$ (b) $H_3C—\overset{\overset{O}{\|}}{C}—NH—Ph$

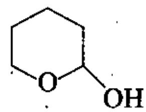
(c) $Ph—CH_2—\overset{\overset{O}{\|}}{C}—NH_2$ (d) $Ph—CH_2—CN$

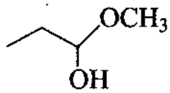
32. Fehling solution gives red precipitate with :

(a) Aromatic aldehyde
(b) Aliphatic aldehyde
(c) Ketone
(d) α-Hydroxy ketones

33. Which of the following compounds will give positive Tollen's test?

(a) $CH_3-\overset{\overset{O}{||}}{C}-H$

(b) 

(c) 

(d) $H_3C-CH\left\langle\begin{matrix}OCH_3\\OCH_3\end{matrix}\right.$

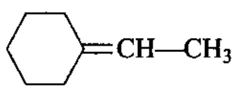
34. Silver mirror test with Tollen's reagent is given by :

(a) $Ph-\underset{\underset{O}{||}}{C}-H$

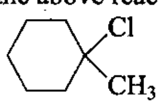
(b) $Ph-\underset{\underset{H}{|}}{N}-OH$

(c) $Ph-CH_2-\underset{\underset{O}{||}}{C}-CH_2-OH$

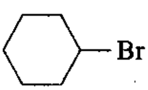
(d) $H_3C-C\equiv CH$

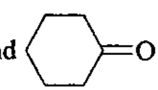
35. $A \xrightarrow[3.\ B]{1.\ Ph_3P \quad 2.\ BuLi}$ 

In the above reaction A and B will respectively be :

(a)  and HCHO

(b)  and H_3C-CHO

(c)  and $H_3C-\overset{\overset{O}{||}}{C}-H$

(d) H_3C-CH_2-Br and 

36. Mixture of $Ph-\overset{\overset{O}{||}}{C}-H$ and HCHO is treated with NaOH, then Cannizzaro reaction involves :

(a) Reduction of HCHO
(b) Oxidation of HCHO
(c) Reduction of PhCHO
(d) Oxidation of PhCHO

37. Which of the following form stable hemiketal?

(a) $Ph-\overset{\overset{O}{||}}{C}-Ph$

(b) $HO-(CH_2)_3-\overset{\overset{O}{||}}{C}-CH_3$

(c) $HOH_2C-\overset{\overset{O}{||}}{C}-(CHOH)_3-CH_2OH$

(d) $HO-CH_2-(CH_2)_4-\overset{\overset{O}{||}}{C}-CH_3$

38. Among the following compounds which will react with acetone to give a product containing $\rangle C{=}N-$?

(a) $C_6H_5NH_2$ (b) $(CH_3)_3N$

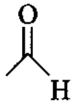
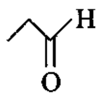
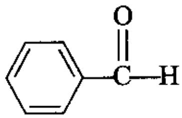
(c) $Ph-\underset{\large H}{\underset{|}{N}}-Ph$ (d) $Ph-\underset{\large H}{\underset{|}{N}}-NH_2$

39. A new C—C bond formation is possible in :

(a) Aldol condensation (b) Friedel-Crafts alkylation

(c) Clemmensen reduction (d) Reimer-Tiemann reaction

40. Which of the following will undergo aldol condensation?

(a)  (b)  (c)  (d) $D_3C-\overset{O}{\overset{\|}{C}}-H$

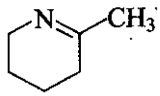
41. Which of the following will not react with H_2O?

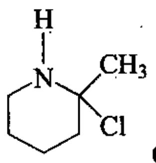
(a) $CHCl_3$ (b) Cl_3C-CHO (c) CCl_4 (d) 

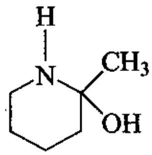
42. Grignard reagents produce carbonyl compounds with :

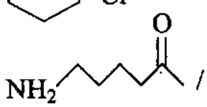
(a) CO_2 (b) $R-C{\equiv}N$ (c) $R-\overset{O}{\overset{\|}{C}}-Cl$ (d) $R-\overset{O}{\overset{\|}{C}}-O-R'$

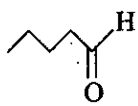
43. The given imine can be prepared from which of the following reactions?



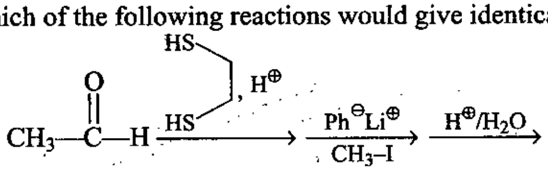
(a) 

(b)  $/ H^{\oplus}$

(c)  $/ H^{\oplus}$

(d)  $+ NH_3$

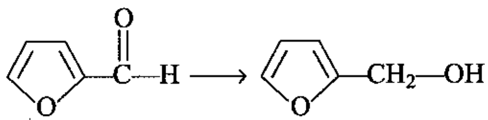
44. Which of the following reactions would give identical product?

(a) 

(b) $CH_3-\overset{O}{\overset{\|}{C}}-H \xrightarrow[\overset{\oplus}{H}/H_2O]{CH_3MgBr} \xrightarrow{pcc.}$

(c) $CH_3—\overset{\overset{\large CH_3}{|}}{C}=CH—CH_3 \xrightarrow{O_sO_4} \xrightarrow{HIO_4}$

(d) $CH_3—\overset{\overset{\large Cl}{|}}{CH}—CH_3 \xrightarrow{\text{alc. KOH}} \xrightarrow[\text{Zn—}H_2O]{O_3}$

45. 

Identify the reagents that can perform this conversion successfully :

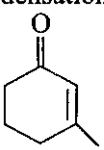
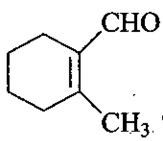
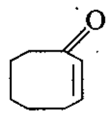
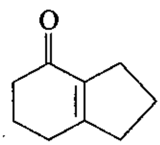
(a) H_2, Raney Ni, Δ

(b) Mg.THF, H_2O

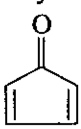
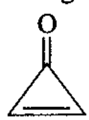
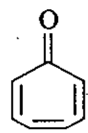
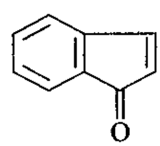
(c) $NaBH_4$, H_2O

(d) $H—\overset{\overset{\large O}{\|}}{C}—H$, $\overset{\ominus}{O}H$

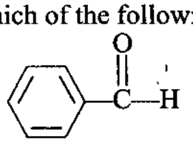
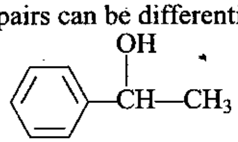
46. Which of the following compounds can be synthesized by intramolecular aldol condensation in very good yield?

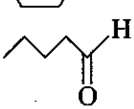
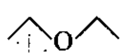
(a) 
(b) 
(c) 
(d) 

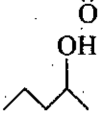
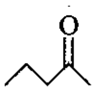
47. Identify the compounds that give aromatic salt on reaction with $HClO_4$:

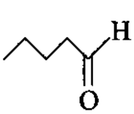
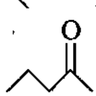
(a) 
(b) 
(c) 
(d) 

48. Which of the following pairs can be differentiated by Tollen's reagent?

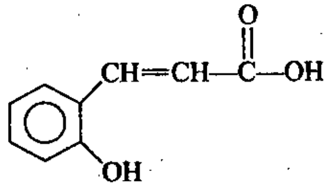
(a)  and 

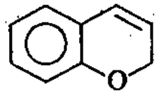
(b)  and 

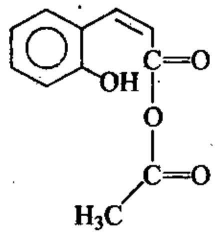
(c)  and 

(d)  and 

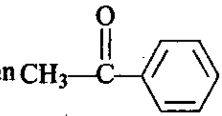
49. When salicyl aldehyde is treated with $(CH_3CO)_2O$ in presence of $CH_3COO^{\ominus}Na^{\oplus}$, Δ:

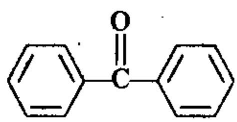
(a)  is major product

(b)  is the major product

(c)  is formed as intermediate, which finally condense and form the product.

(d) This reaction is Perkin condensation.

50. Which of the following compounds will react faster than  with CH_3MgBr?

(a) 

(b) $CH_3-\overset{\overset{\large O}{\|}}{C}-H$

(c) $CH_3-\overset{\overset{\large O}{\|}}{C}-\ddot{N}H_2$

(d) $CH_3-\overset{\overset{\large O}{\|}}{C}-Cl$

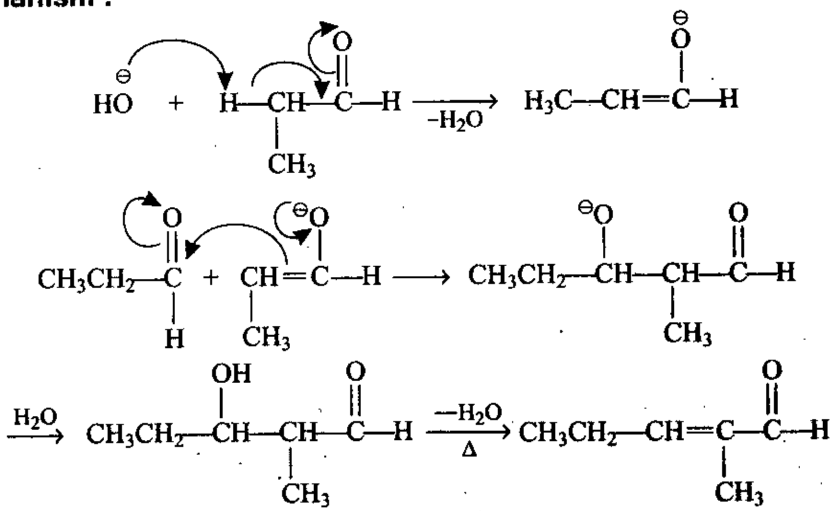
EXERCISE-3 LINKED COMPREHENSION TYPE

Passage-1

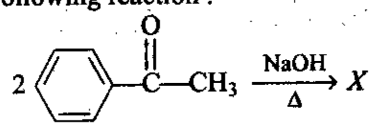
The addition reaction of enol or enolate to the carbonyl function of aldehyde or ketone is known as aldol addition. The β-hydroxyaldehyde or β-hydroxyketone so obtained undergo dehydration in second step to produce a conjugated enone. The first part of reaction is an addition reaction and the second part is an elimination reaction. Carbonyl compound having α-hydrogen undergoes aldol condensation reaction.

$$2CH_3CH_2-\overset{\overset{O}{\|}}{C}-H \xrightarrow[\Delta]{\ominus OH} CH_3CH_2CH=\underset{\underset{CH_3}{|}}{C}-\overset{\overset{O}{\|}}{C}-H$$

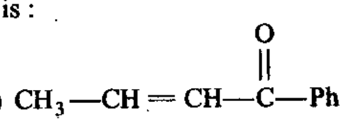
Mechanism :

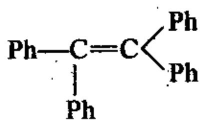


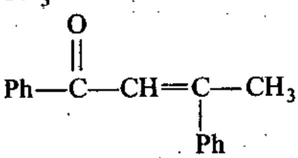
1. Find out product of following reaction :



X is :

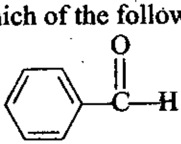
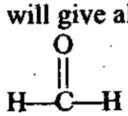
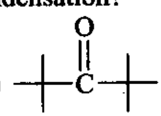
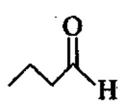
(a) 

(b) 

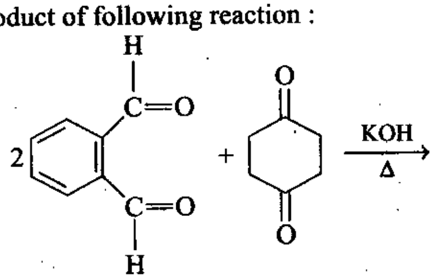
(c) 

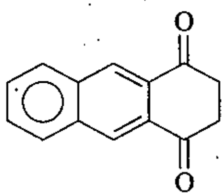
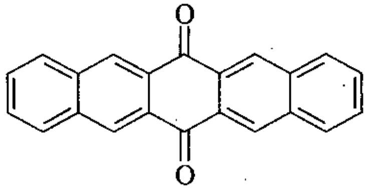
(d) None of these

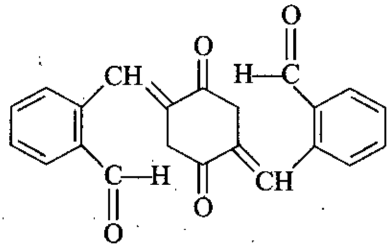
2. Which of the following will give aldol condensation?

(a) 
(b) 
(c) 
(d) 

3. Find out major product of following reaction :

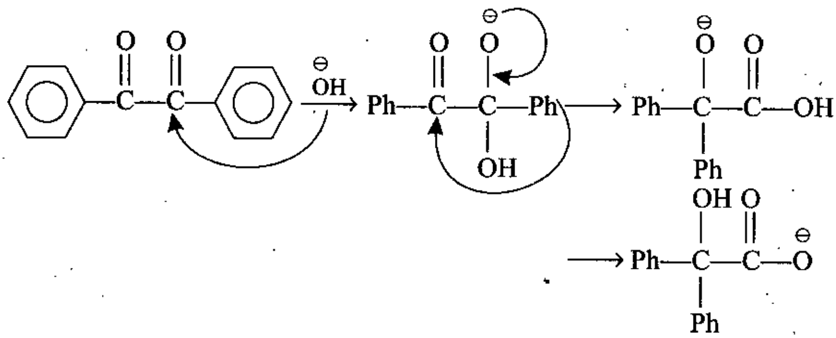


(a)  (b) 

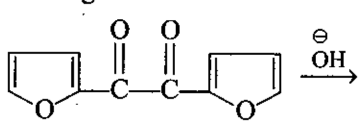
(c)  (d) None of these

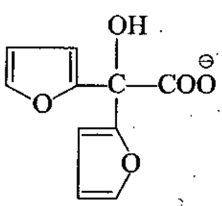
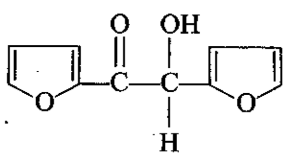
Passage-2

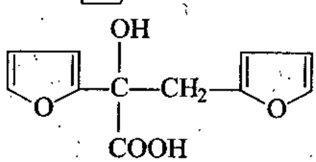
The base catalysed reaction of 1, 2-diketone to a salt of 2-hydroxy carboxylic acid is known as benzilic acid rearrangement. The reaction is not applicable to 1, 2-diketones containing α-methylene group because of competing aldol condensation.

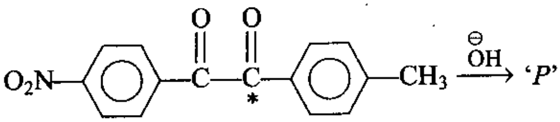


4. Find out product of following reaction :

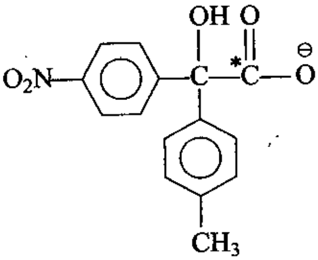


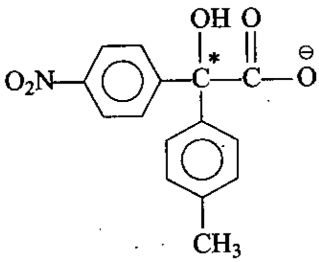
(a)  (b) 

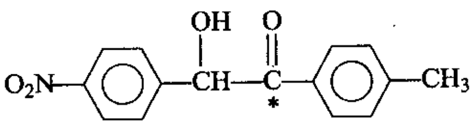
(c)  (d) None of these

5. 

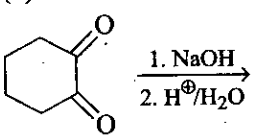
Find '*P*' :

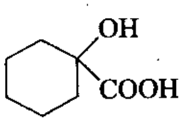
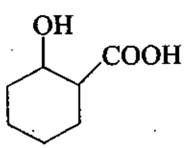
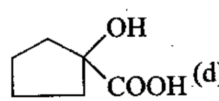
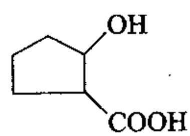
(a) 

(b) 

(c) 

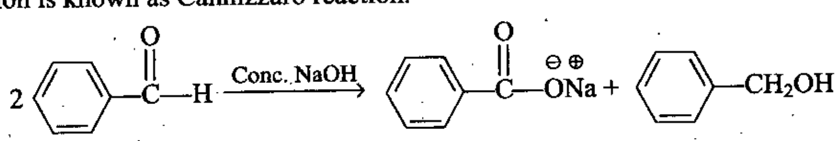
(d) None of the above

6. 

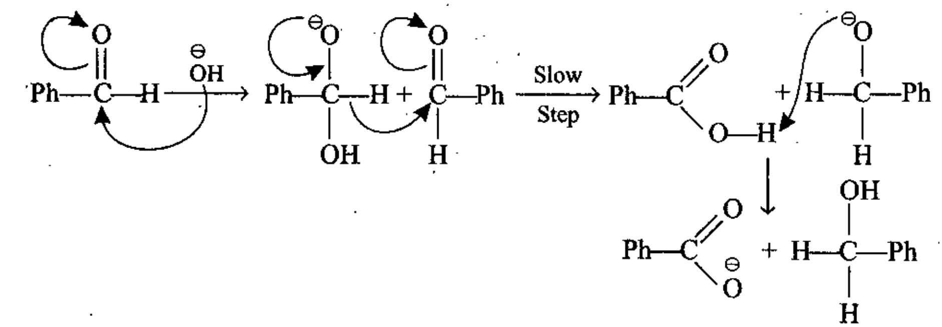
(a)  (b)  (c)  (d) 

Passage-3

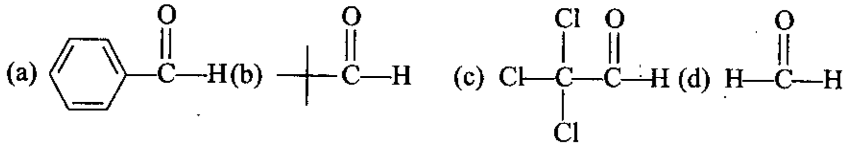
When an aldehyde with no α-hydrogen react with concentrated aqueous NaOH, half the aldehyde is converted to carboxylic acid salt and other half is converted to an alcohol. In other words, half the reaction is oxidized and other half is reduced. This reaction is known as Cannizzaro reaction.



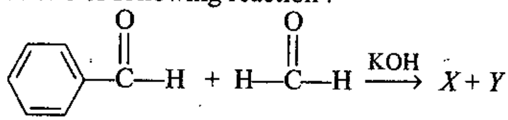
Mechanism :



7. Which of the following will not give Cannizzaro reaction?



8. Find out the products of following reaction :



X and Y are :

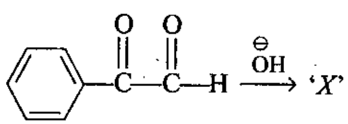
(a) $Ph-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{O}$ and CH_3OH

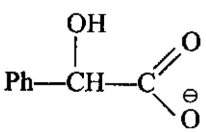
(b) $Ph-CH_2OH$ and $H-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{O}$

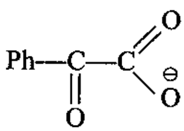
(c) $Ph-CH_2OH$ and CH_3OH

(d) $Ph-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{O}$ and $H-\overset{\overset{O}{\|}}{C}-\overset{\ominus}{O}$

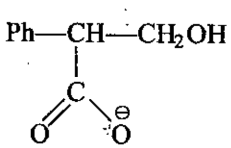
9. Find out 'X' of the reaction :



(a) 

(b) 

(c) $Ph-\overset{\overset{O}{\|}}{C}-CH_2OH$

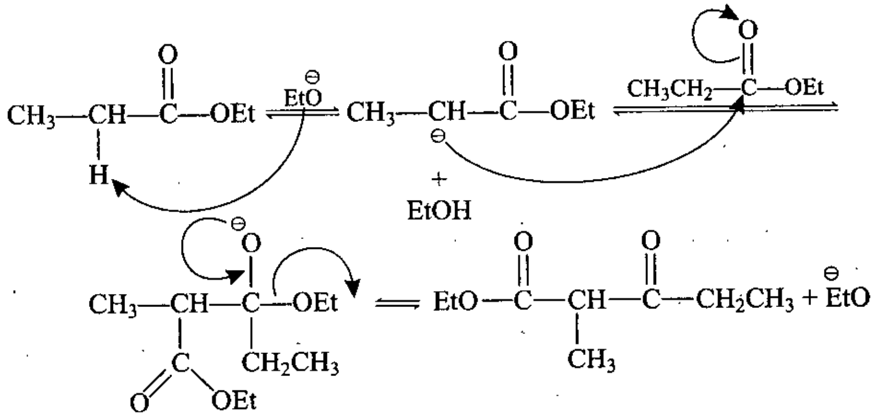
(d) 

Passage-4

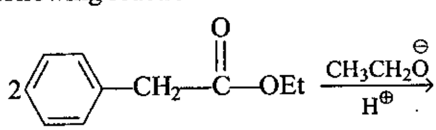
When two molecules of an ester undergo a condensation reaction, the reaction is called a Claisen condensation. The product of a Claisen condensation is β-ketoester.

$$2CH_3CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OEt \xrightarrow[2.\ H^{\oplus}]{1.\ CH_3CH_2\overset{\ominus}{O}} CH_3CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-\underset{\underset{\displaystyle CH_3}{|}}{CH}-\overset{\overset{\displaystyle O}{\|}}{C}-OEt + EtOH$$

Mechanism :



10. Find out product of following reaction :



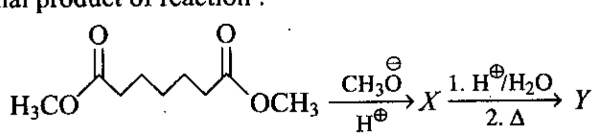
(a) $Ph-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-CH_2-Ph$

(b) $Ph-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-\underset{\underset{\displaystyle Ph}{|}}{CH}-\overset{\overset{\displaystyle O}{\|}}{C}-OEt$

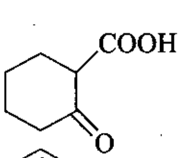
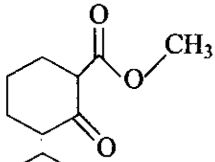
(c) $Ph-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-\underset{\underset{\displaystyle Ph}{|}}{CH}-\overset{\overset{\displaystyle O}{\|}}{C}-OH$

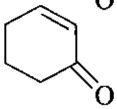
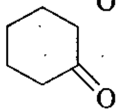
(d) None of these

11. Find out final product of reaction :

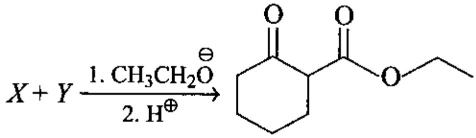


'*Y*' is :

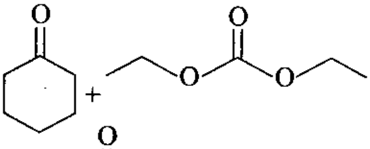
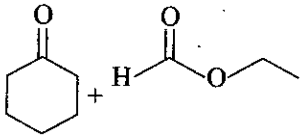
(a) 
(b) 

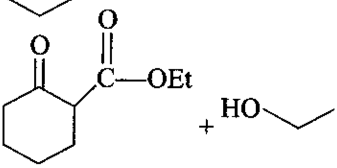
(c) 
(d) 

12. Find out starting materials for following β-ketoester :



'*X*' and '*Y*' are :

(a) 
(b) 

(c) 
(d) None of these

Passage-5

An organic compound *A* has molecular formula $C_{11}H_{14}O$. *A* on treatment with $H_2N—OH$ yields two stereoisomer *B* and *C* having molecular formula $C_{11}H_{15}NO$. *B* and *C* on treatment with concentrated H_2SO_4 yield *D* and *E*. *D* and *E* are respective isomer of *B* and *C*. *D* on alkaline hydrolysis produces optically active amine *F* ($C_4H_{11}N$). *E* on alkaline hydrolysis produces aniline as one product.

13. Find out structure of organic compound *A* :

(a) $Ph—CH_2—\overset{\overset{O}{||}}{C}—CH(CH_3)_2$

(b) $Ph—\overset{\overset{O}{||}}{C}—CH_2—CH(CH_3)_2$

(c) $Ph—CH_2—\overset{\overset{O}{||}}{C}—CH_2—CH_2—CH_3$

(d) $Ph—\overset{\overset{O}{||}}{C}—\underset{\underset{CH_3}{|}}{CH}—CH_2CH_3$

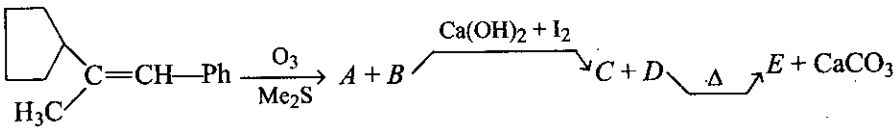
14. Compounds B and D are :

(a) Functional isomer
(b) Enantiomer
(c) Geometrical isomer
(d) Metamers

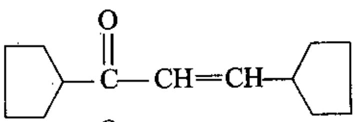
15. Compounds D and E are :

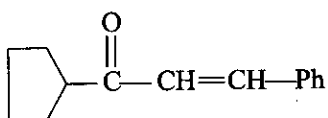
(a) Functional isomer
(b) Enantiomer
(c) Geometrical isomer
(d) Metamers

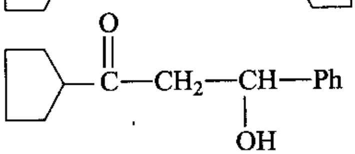
Passage-6



16. $A + B \xrightarrow[\Delta]{NaOH}$ Product :

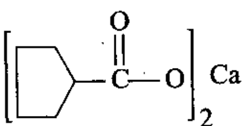
(a) 

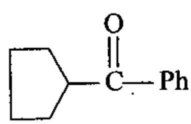
(b) 

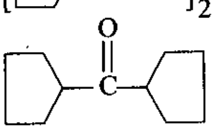
(c) 

(d) $Ph-CH=CH-\overset{\overset{O}{\|}}{C}-Ph$

17. Find correct structure of E :

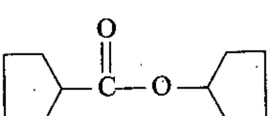
(a) 

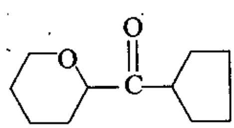
(b) 

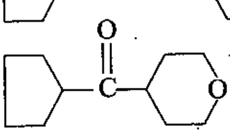
(c) 

(d) None of these

18. $E \xrightarrow{CF_3CO_3H}$ Product :

(a) 

(b) 

(c) 

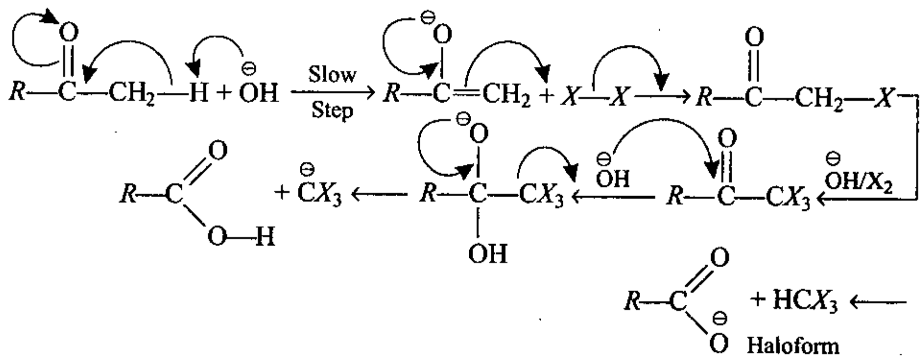
(d) None of these

Passage-7

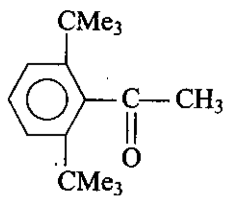
Compound having $-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$ group reacts rapidly with halogen in presence of a base to form haloform. The reaction is known as haloform.

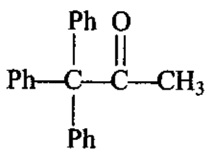
$$R-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3 \xrightarrow{X_2 + \overset{\ominus}{O}H} R-\overset{\overset{\displaystyle O}{\|}}{C}-\overset{\ominus}{O} + CHX_3$$

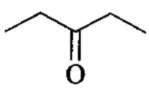
Mechanism :

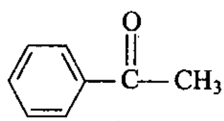


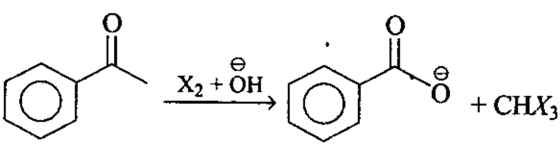
19. Which of the following will yield iodoform on reaction with $I_2 + NaOH$?

(a) 

(b) 

(c) 

(d) 

20. 

Which of the following is correct comparison of rate of haloform reaction with various halogens?

(a) $r_{Cl_2} > r_{Br_2} > r_{I_2}$

(b) $r_{I_2} > r_{Br_2} > r_{Cl_2}$

(c) $r_{Cl_2} = r_{Br_2} = r_{I_2}$

(d) $r_{Br_2} > r_{Cl_2} > r_{I_2}$

21. Consider the following reactions :

$$\textbf{Reaction I} \rightarrow \mathrm{Ph{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}CH_3} \xrightarrow{\mathrm{Cl_2},\ \overset{\ominus}{\mathrm{O}}\mathrm{H}} \mathrm{Ph{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}\overset{\ominus}{O}} + \mathrm{CHCl_3}$$

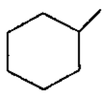
$$\textbf{Reaction II} \rightarrow \mathrm{Ph{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}CD_3} \xrightarrow{\mathrm{Cl_2},\ \overset{\ominus}{\mathrm{O}}\mathrm{H}} \mathrm{Ph{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}\overset{\ominus}{O}} + \mathrm{CDCl_3}$$

Which of the following is correct comparison of the rate of reaction I and II :

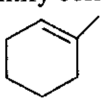
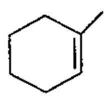
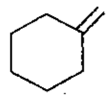
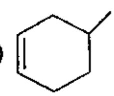
(a) $r_{\mathrm{I}} > r_{\mathrm{II}}$ (b) $r_{\mathrm{I}} < r_{\mathrm{II}}$

(c) $r_{\mathrm{I}} = r_{\mathrm{II}}$ (d) Cannot be determined

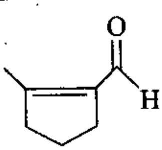
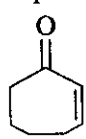
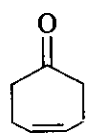
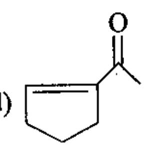
Passage-8

 $\xrightarrow[\text{hv}]{\mathrm{Br_2}\text{ (1 Mole)}} X \xrightarrow{\text{alc KOH}} \underset{\text{(Major)}}{Y} \xrightarrow[\mathrm{Me_2S}]{\mathrm{O_3}} Z \xrightarrow{\mathrm{NaOH},\ \Delta} P$

22. Identify correct structure of 'Y' :

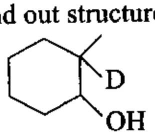
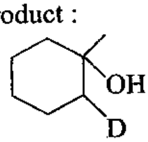
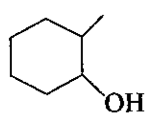
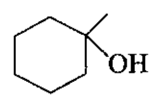
(a)  (b)  (c)  (d) 

23. Find out structure of final product P:

(a)  (b)  (c)  (d) 

24. $Y \xrightarrow[\mathrm{H_2O_2},\ ^{\ominus}\mathrm{OH}]{\mathrm{BD_3{\cdot}THF}}$ Product

Find out structure of product :

(a)  (b)  (c)  (d) 

Passage-9

An organic compound (A) $C_8H_{10}O$ was subjected to a series of test in laboratory. It was found that this compound :

(i) Rotates the plane polarized light.

(ii) Evolves H_2 gas with Na.

(iii) Reacts with I_2 and NaOH to produce yellow ppt.

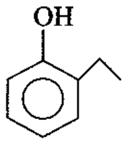
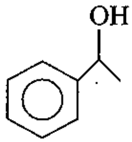
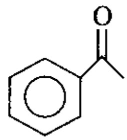
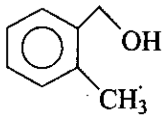
(iv) Does not react with Br_2/CCl_4

(v) Reacts with hot $KMnO_4$ to form (B) $C_7H_6O_2$, which can also be synthesized by benzene and carbonyl chloride followed by hydrolysis.

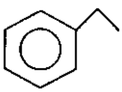
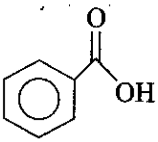
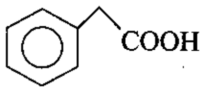
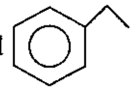
(vi) Loses optical activity as a result of reduction with Red P + HI to form 'C'.

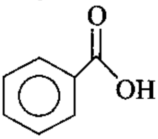
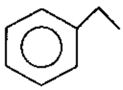
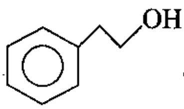
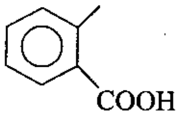
(vii) Reacts with Lucas reagent in about 5 minutes.

25. Find out structure of compound '*A*' :

(a)  (b)  (c)  (d) 

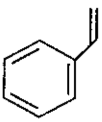
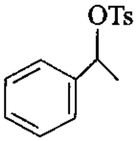
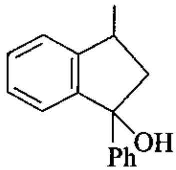
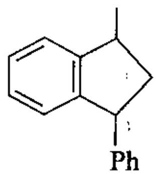
26. Compounds *B* and *C* are respectively :

(a)  and  (b)  and 

(c)  and  (d)  and 

27. $A \xrightarrow{\text{TsCl}} X \xrightarrow{\text{alc. KOH}} Y \xrightarrow{\text{conc. } H_2SO_4} Z$

Find out correct structure of *Z*.

(a)  (b)  (c)  (d) 

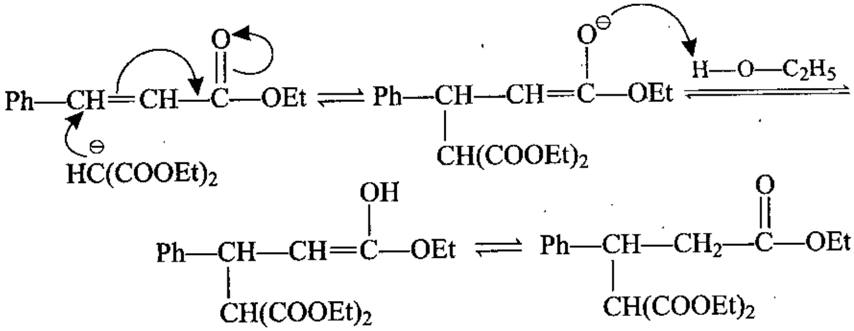
Passage-10

The base catalysed addition of a compound having active methylene group (or relatively acidic hydrogen) to activate alkene is known as Michael addition reaction.

$$\text{Ph—CH=CH—}\overset{\overset{\large O}{\|}}{\text{C}}\text{—OEt} + H_2C(COOEt)_2 \xrightarrow{C_2H_5\overset{\ominus}{O}Na^{\oplus}} \text{Ph—}\underset{\underset{\large CH(COOEt)_2}{|}}{\text{CH}}\text{—}CH_2\text{—}\overset{\overset{\large O}{\|}}{\text{C}}\text{—OEt}$$

Mechanism :

$$C_2H_5\overset{\ominus}{O} + \text{H—CH(COOEt)}_2 \rightleftharpoons \overset{\ominus}{C}H(COOEt)_2 + C_2H_5OH$$



28. Find out product of following reaction :

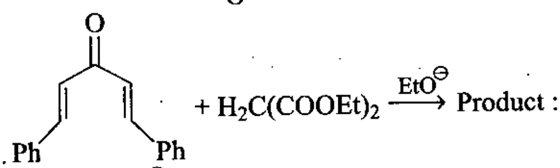
$$H_3C-CH=CH-NO_2 + H_2C(CHO)_2 \xrightarrow{C_2H_5O^{\ominus}} \text{Product :}$$

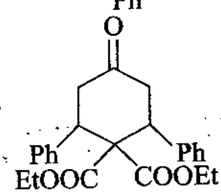
(a) $H_3C-CH(CH(NO_2)_2)-CH_2-\overset{O}{\overset{\|}{C}}-H$

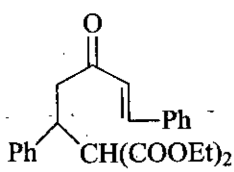
(b) $H_3C-CH(CH(CHO)_2)-CH_2-\overset{O}{\overset{\|}{C}}-H$

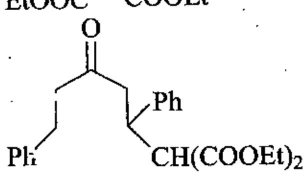
(c) $H_3C-CH(CH_2-\underset{O}{\underset{\|}{C}}-H)-CH_2-NO_2$

(d) None of these

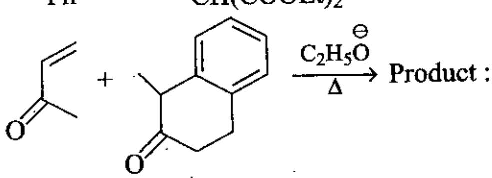
29. 

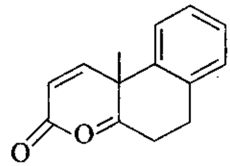
(a) 

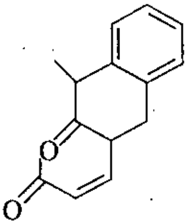
(b) 

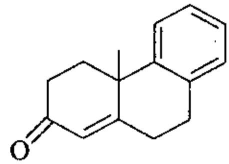
(c) 

(d) None of these

30. 

(a) 

(b) 

(c) 

(d) None of these

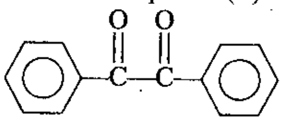
Passage 11

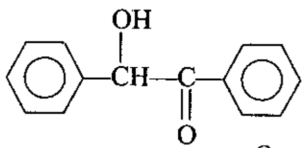
An organic compound (A), C_7H_6O gives positive test with Tollen's reagent, on treatment with alcoholic $\overset{\ominus}{C}N$, (A) yields the compound (B), $C_{14}H_{12}O_2$. Compound (B) on reduction with Zn-Hg, HCl and dehydration gives an unsaturated compound (C), which adds one mole of Br_2/CCl_4. The compound (B) can oxidized with HNO_3 to a compound (D), $C_{14}H_{10}O_2$. Compound (D) on heating with KOH undergoes rearrangement and subsequent acidification of rearranged products yields an acidic compound (E), $C_{14}H_{12}O_3$.

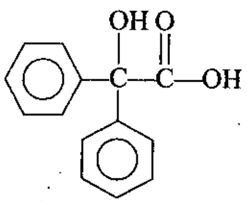
31. Compound (A) cannot undergo :

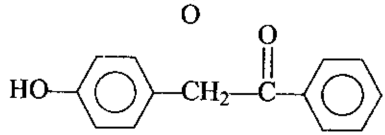
(a) Benzoin condensation
(b) Cannizzaro reaction
(c) Aldol condensation
(d) Perkin condensation

32. Structure of compound (B) is :

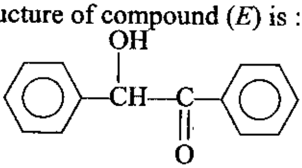
(a) 

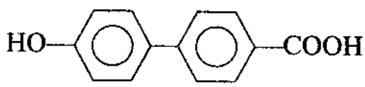
(b) 

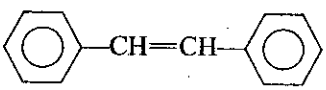
(c) 

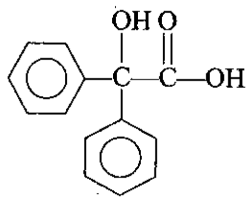
(d) 

33. Structure of compound (E) is :

(a) 

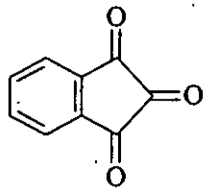
(b) 

(c) 

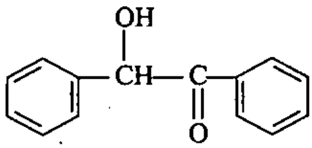
(d) 

EXERCISE-4 MATRIX MATCH TYPE

1. Column (I) | Column (II)

(a) 

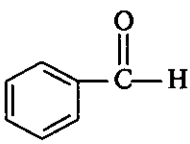
P. Positive Fehling solution test

(b) 

Q. Form highly stable hydrate

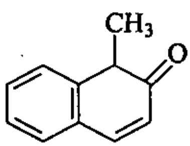
(c) $H_3C—\overset{\overset{\large O}{\|}}{C}—H$

R. Turns 2, 4-dinitrophenyl hydrazine test

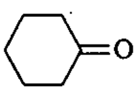
(d) 

S. Positive Tollen's test

2. Column (I) | Column (II)

(a) 

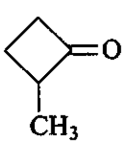
P. No geometrical isomer on treatment with $H_2N—OH, H^{\oplus}$

(b) 

Q. Racemisation on treatment with aqueous $H^{\oplus}/\overset{\ominus}{O}H$

(c) $H_2C{=}CH—\overset{\overset{\large O}{\|}}{C}—H$

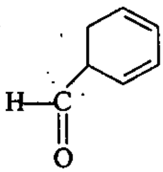
R. Michael addition with $H_2C(COOEt)_2, Et\overset{\ominus}{O}$

(d) 

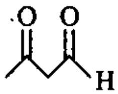
S. Condensation with $Ph—\underset{\underset{\large O}{\|}}{C}—H, \overset{\ominus}{O}H$

3. Column (I) | Column (II)

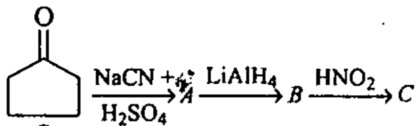
(a) $Ph-CH_2-\overset{O}{\overset{\|}{C}}-CH=CH_2$ | *P*. 1, 4-addition

(b)  | *Q*. Tautomerism

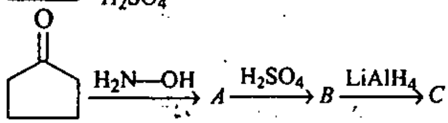
(c)  | *R*. $AgNO_3/NH_4OH$

(d)  | *S*. 2, 4-DNP test

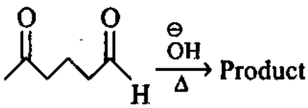
4. Column (I) | Column (II)

(a) 

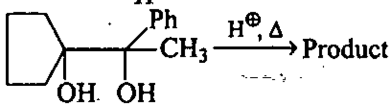
P. Formation of six member ring takes place

(b) 

Q. Final product is ketone

(c) 

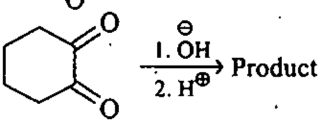
R. Final product will give positive Tollen's test

(d) 

S. Final product will react with 2, 4-DNP

5. Column (I) | Column (II)

(a) $Ph-\underset{O}{\underset{\|}{C}}-H \xrightarrow{\text{alkaline KCN}}$ Product | *P*. Final product forms positive Tollen's test

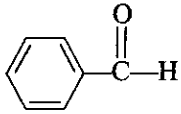
(b) 

Q. Final product gives test with 2, 4-DNP

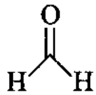
(c) $H_3C-\underset{O}{\underset{\|}{C}}-OEt \xrightarrow[\text{2. } H_3^{\oplus}O \;\; \text{3. } \Delta]{\text{1. } Et\overset{\ominus}{O}Na^{\oplus}}$ Product | *R*. Final product reacts with $NaHCO_3$ and liberated CO_2 gas

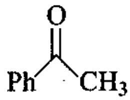
(d) $Ph-\underset{O}{\underset{\|}{C}}-H \xrightarrow[\text{2. } H^{\oplus}]{\text{1. KOH}}$ Product | *S*. Final product reacts with Na and liberated H_2 gas.

6. Column (I) | **Column (II)**

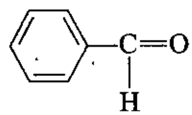
(a)  | *P.* Aldol condensation

(b)  | *Q.* Cannizzaro reaction

(c)  | *R.* Benzoin condensation

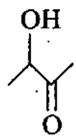
(d)  | *S.* Claisen-Schmidt reaction

7. Column (I) | **Column (II)**

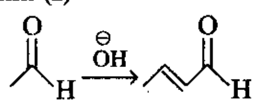
(a)  | *P.* Positive Iodoform test

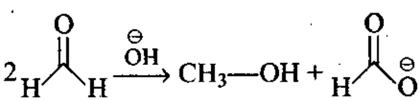
(b) $H_3C-\underset{\underset{O}{\|}}{C}-H$ | *Q.* Reduces Fehling solution

(c) $H-\underset{\underset{O}{\|}}{C}-H$ | *R.* Positive Tollen's test

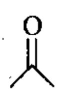
(d)  | *S.* Brady's reagent turns red

8. Column (I) | **Column (II)**

(a) 2  | *P.* Oxidation

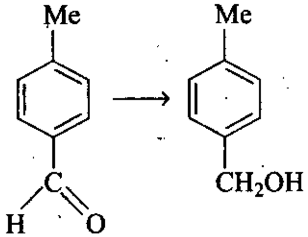
(b)  | *Q.* Condensation

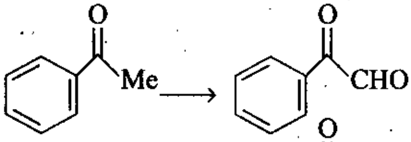
(c) $2Ph-\overset{\overset{O}{\|}}{C}-H \xrightarrow{KCN}$ Product | *R.* Nucleophilic addition

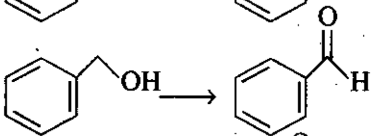
(d)  $\xrightarrow{I_2+\overset{\ominus}{O}H}$ Product | *S.* Electrophilic substitution

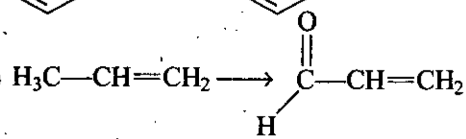
T. Nucleophilic substitution

9. Column (I) **Column (II)**

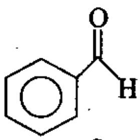
(a)  *P*. $NaBH_4$

(b)  *Q*. MnO_2

(c)  *R*. $H-\overset{O}{\overset{\|}{C}}-H$, KOH

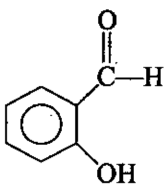
(d)  *S*. SeO_2

10. Column (I) **Column II**

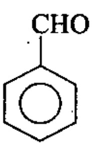
(a)  *P*. Fehling solution

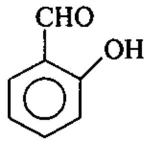
(b) $H_3C-\overset{O}{\overset{\|}{C}}-CH_3$ *Q*. 2,4-dintrophenyl hydrazine test

(c) $H-\overset{O}{\overset{\|}{C}}-H$ *R*. Tollen's reagent

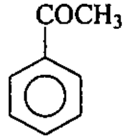
(d)  *S*. Iodoform test

11. Column (I) **Column II**

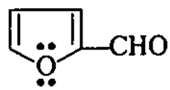
(a)  *P*. Perkin condensation

(b) 

Q. Cannizzaro reaction

(c) 

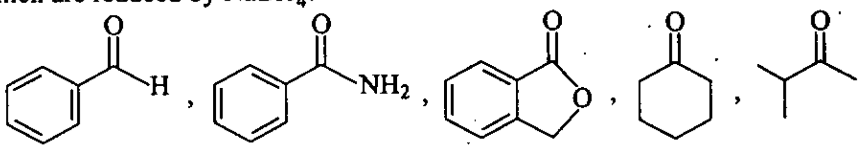
R. Aldol condensation

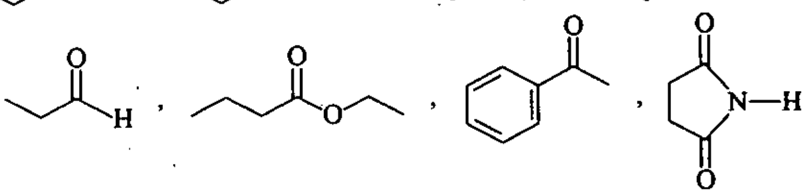
(d) 

S. Haloform reaction

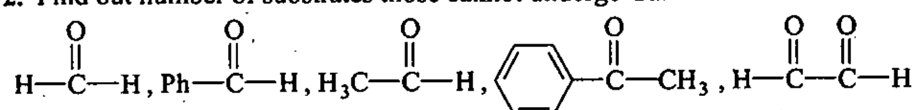
EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

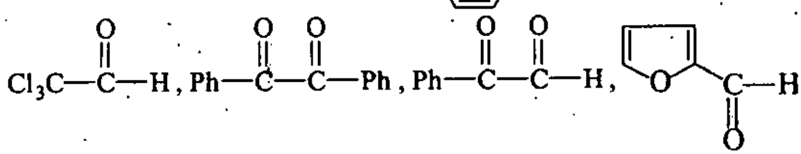
1. Examine the structural formulas given below and identify number of compounds which are reduced by $NaBH_4$.



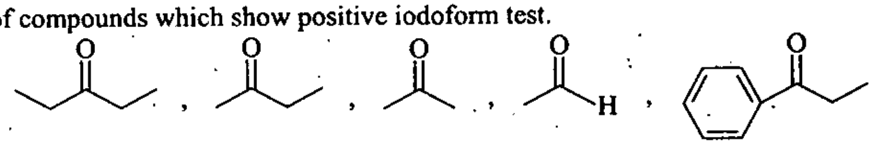


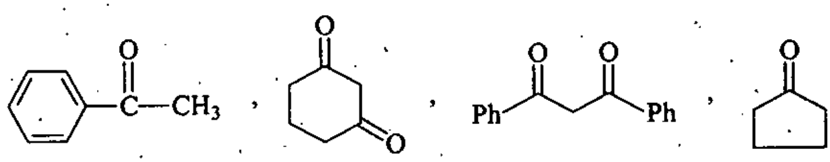
2. Find out number of substrates those cannot undergo Cannizzaro's reaction.





3. Examine the structural formulas of compounds given below and identify number of compounds which show positive iodoform test.





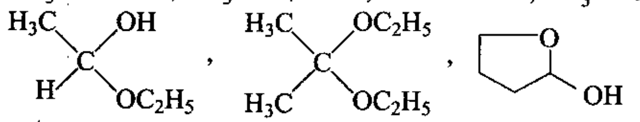
4. Find out number of products obtained by cross Cannizzaro's reaction between

(a) $H-\overset{\overset{\displaystyle O}{\|}}{C}-H + Ph-\overset{\overset{\displaystyle O}{\|}}{C}-H \xrightarrow[H_2O]{NaOH}$

(b) $Ph-\overset{\overset{\displaystyle O}{\|}}{C}-H + (CH_3)_3C-\overset{\overset{\displaystyle O}{\|}}{C}-H \xrightarrow[H_2O]{KOH}$

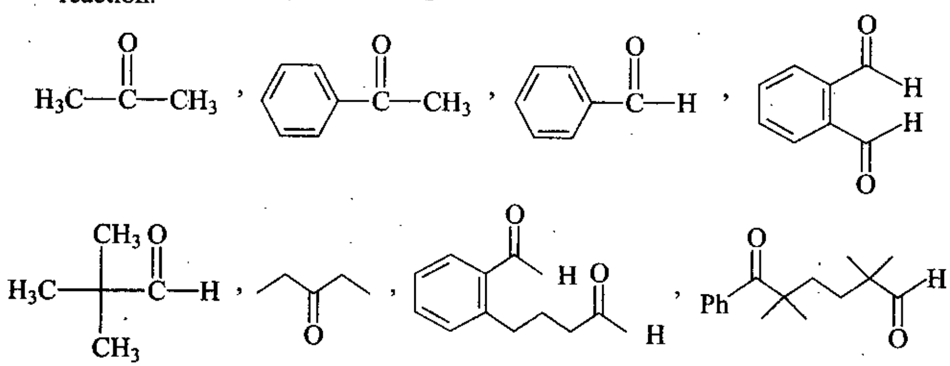
5. Of the following compounds, how many would give positive test with Tollen's reagent.

$CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-H$, $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-OH$, $H-\overset{\overset{\displaystyle O}{\|}}{C}-OH$, $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$, $Ph-\overset{\overset{\displaystyle O}{\|}}{C}-H$

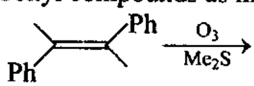


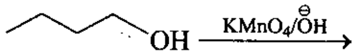
, $CH_3-C\equiv C-H$

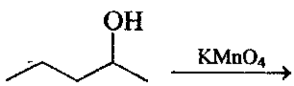
6. Of the following carbonyl compounds, how many would give aldol condensation reaction.

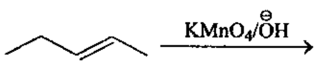


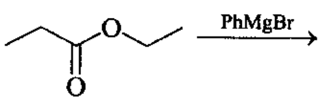
7. Consider the following reactions and identify how many reactions can give carbonyl compounds as major product.

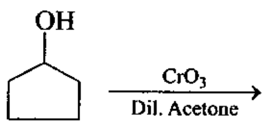
(a) 

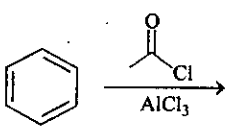
(b) 

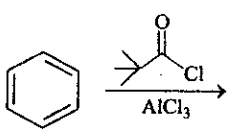
(c) 

(d) 

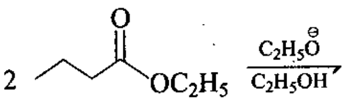
(e) 

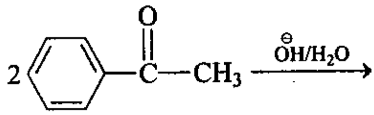
(f) 

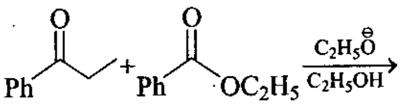
(g) 

(h) 

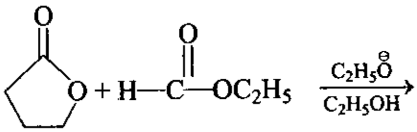
8. Consider the following reactions, and find out number of reactions which are Claisen condensation in nature.

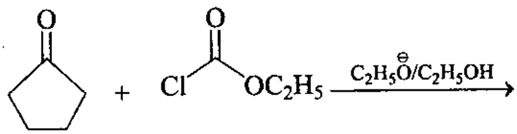
(a) 

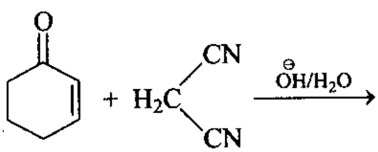
(b) 

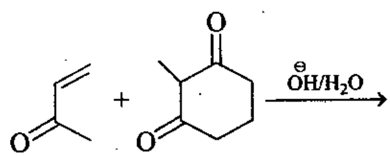
(c) 

(d) $2H-\overset{O}{\overset{\|}{C}}-H \xrightarrow{KOH}$

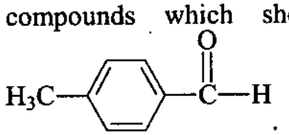
(e) 

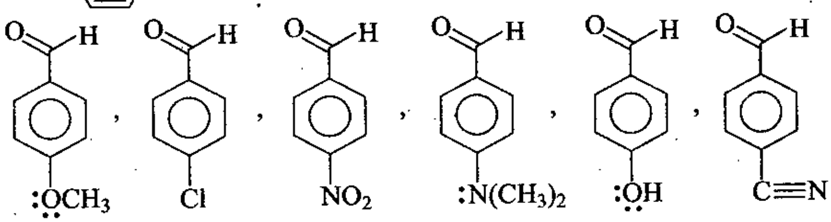
(f) 

(g) 

(h) 

9. Examine the structural formulas of following compounds and find out number of compounds which show higher rate of nucleophilic addition than





10. $R-\overset{O}{\overset{\|}{C}}-R \xrightarrow{?} R-CH_2-R$

Identify numbers of reagent that can be used for above conversion.

(a) Zn—Hg / HCl (b) $LiAlH_4$ (c) $CHCl_3 + NaOH$

(d) $N_2H_4 / \overset{\ominus}{O}H$ (e) $\begin{array}{l} CH_2-SH \\ | \\ CH_2-SH \end{array}$, H_2 / Ni (f) SeO_2

ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (c)	2. (b)	3. (b)	4. (b)	5. (d)	6. (b)	7. (d)	8. (d)	9. (c)	10. (d)
11. (c)	12. (d)	13. (a)	14. (b)	15. (b)	16. (b)	17. (c)	18. (b)	19. (b)	20. (c)
21. (a)	22. (d)	23. (d)	24. (a)	25. (b)	26. (d)	27. (d)	28. (a)	29. (d)	30. (d)
31. (c)	32. (c)	33. (c)	34. (a)	35. (d)	36. (b)	37. (b)	38. (b)	39. (a)	40 (d)
41. (c)	42. (b)	43. (b)	44. (a)	45. (b)	46. (a,d)	47 (b)	48. (a,b)	49. (a,c,d)	50. (b)
51. (a)	52. (c)								

Level-2

1. (c)	2. (b)	3. (a)	4. (a)	5. (b)	6. (a)	7 (d)	8. (b)	9. (c)	10. (c)
11. (b)	12. (d)	13. (b)	14 (a)	15 (b)	16. (c)	17. (a)	18. (d)	19. (c)	20. (b)
21. (b)	22. (b)	23. (d)	24. (d)	25 (a)	26 (a)	27. (a)	28. (c)	29. (d)	30. (c)
31. (c)	32. (a)	33. (c)	34. (b)	35 (a)	36. (d)	37 (c)	38. (c)	39. (b)	40 (d)
41. (c)	42. (a)	43 (b)	44. (a)	45 (d)	46. (a)	47 (d)	48. (b)	49. (b)	50. (d)
51. (b)	52. (a)	53. (b)	54. (c)	55 (d)	56. (a)	57 (a)	58. (d)	59. (c)	60. (b)
61. (c)	62. (d)	63 (a)	64. (b)	65 (c)	66. (d)	67 (c)	68. (c)	69. (a)	70. (b)
71. (d)	72 (d)	73. (d)	74. (a)	75 (d)	76 (a)	77. (b)	78. (c)	79. (b)	80. (c)
81. (a)	82. (b)	83. (d)	84. (b)	85. (a)	86. (c)	87 (b)	88. (c)	89. (d)	90. (a)
91. (b)	92. (c)	93. (b)	94 (b)	95. (c)	96. (c)	97. (d)	98. (c)	99 (a)	100. (a)
101. (b)	102. (d)	103. (a)	104. (a)	105. (b)	106. (b)	107. (c)	108. (d)	109. (b)	110. (a)
111. (d)	112. (c)	113. (b)	114 (a)	115. (b)	116. (c)	117. (a)	118. (a)	119. (a)	120. (c)
121. (d)	122. (b)	123. (b)	124. (b)	125. (b)	126 (c)	127. (c)	128. (a)	129. (c)	130. (b)
131. (a)	132. (d)	133. (b)	134 (c)	135. (c)	136. (b)	137 (b)	138. (a)	139 (d)	140. (b)
141. (b)	142. (a)	143 (b)	144. (d)	145. (c)	146. (b)	147. (a)	148. (c)	149. (d)	150. (b)
151. (c)	152. (a)	153. (b)	154. (c)	155. (b)	155. (a)	157. (b)	158. (d)	159. (b)	160. (c)

Exercise-2 : More Than One Correct Answers

1. (b, d)	2. (a, b)	3. (c, d)	4. (b, c)	5. (a, b, c)	6. (a, b, c, d)
7. (a, d)	8. (a, b, d)	9. (b, c, d)	10. (b, d)	11. (a, b, c)	12. (a, b, d)
13. (a, b, c)	14. (a, b, d)	15. (a, b, c)	16. (a, b, c)	17. (a, c, d)	18. (a, b, c)
19. (c, d)	20. (b, d)	21. (a, b, c, d)	22. (a, b, d)	23. (a, b, c, d)	24. (b, c)
25. (a, b, c)	26. (a, b, c)	27 (b, c)	28. (a, c, d)	29. (a, b)	30. (b, c)
31. (a, b)	32. (b, d)	33. (a, b, c)	34. (a, b, c, d)	35. (c, d)	36. (b, c)
37 (b, c, d)	38. (a, d)	39. (a, b, d)	40. (a, b, d)	41. (a, b, c, d)	42. (b, c, d)
43. (a, b, c)	44. (a, b, c)	45. (c, d)	46. (a, d)	47. (b, c)	48. (a, b, d)
49. (b, c, d)	50. (b, d)				

Exercise-3 : Linked Comprehension Type

1. (c)	2. (d)	3. (b)	4. (a)	5. (b)	6. (c)	7. (c)	8. (b)	9. (a)	10. (b)
11. (d)	12. (a)	13. (d)	14. (a)	15. (d)	16. (b)	17. (c)	18. (a)	19. (d)	20. (c)
21. (a)	22. (b)	23. (d)	24. (a)	25. (b)	26. (c)	27. (d)	28. (b)	29. (a)	30. (c)
31. (c)	32. (b)	33. (d)							

Exercise-4 : Matrix Match Type

1. (a) $\rightarrow Q, R$;	(b) $\rightarrow P, Q, S$;	(c) $\rightarrow P, R, S$;	(d) $\rightarrow R, S$
2. (a) $\rightarrow Q, R, S$;	(b) $\rightarrow P, S$;	(c) $\rightarrow R$;	(d) $\rightarrow Q, S$
3. (a) $\rightarrow P, Q, S$;	(b) $\rightarrow P, Q, R, S$	(c) $\rightarrow P$;	(d) $\rightarrow Q, R, S$
4. (a) $\rightarrow P, Q, S$;	(b) $\rightarrow P$;	(c) $\rightarrow P, Q, S$;	(d) $\rightarrow P, Q, S$
5. (a) $\rightarrow P, Q, S$;	(b) $\rightarrow R, S$;	(c) $\rightarrow Q$;	(d) $\rightarrow R, S$
6. (a) $\rightarrow Q, R, S$;	(b) $\rightarrow P, S$;	(c) $\rightarrow Q, S$	(d) $\rightarrow P, R, S$
7. (a) $\rightarrow R, S$;	(b) $\rightarrow P, Q, R, S$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow P, Q, R, S$
8. (a) $\rightarrow Q, R$;	(b) $\rightarrow P, R, T$;	(c) $\rightarrow Q, R$	(d) $\rightarrow R, S, T$
9. (a) $\rightarrow P, R$;	(b) $\rightarrow S$;	(c) $\rightarrow Q$;	(d) $\rightarrow S, Q$
10. (a) $\rightarrow Q, R$;	(b) $\rightarrow Q, S$;	(c) $\rightarrow P, Q, R$;	(d) $\rightarrow Q, R, T$
11. (a) $\rightarrow P, Q$;	(b) $\rightarrow P, Q$;	(c) $\rightarrow R, S$;	(d) $\rightarrow P, Q$

Exercise-5 : Integer Answer Type Problems

1. (5)	2. (5)	3. (6)	4. (2, 4)	5. (6)	6. (4)	7. (5)	8. (4)	9. (3)	10. (3)

□□□

Carboxylic Acids and Its Derivatives

EXERCISE-1 ONLY ONE CORRECT ANSWER

LEVEL-1

1. Which of the following products is formed when adipic acid is heated ?

(a)
$$\begin{array}{l} CH_2-CH_2\diagdown \\ | \qquad\qquad\quad O \\ CH_2-CH_2\diagup \end{array}$$

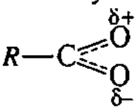
(b)
$$\begin{array}{l} CH_2-CH_2\diagdown \\ | \qquad\qquad\quad C=O \\ CH_2-CH_2\diagup \end{array}$$

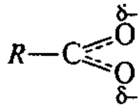
(c)
$$\begin{array}{l} CH_2-CH_2CO\diagdown \\ | \qquad\qquad\qquad O \\ CH_2-CH_2CO\diagup \end{array}$$

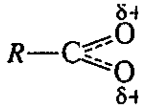
(d)
$$\begin{array}{l} CH_2-CH_2COOH \\ | \\ CH_2-CH_2COOH \end{array}$$

2. $CH_3CH(OH)COOH$ molecule shows :
   (a) geometrical isomerism (b) metamerism
   (c) optical isomerism (d) tautomerism

3. Which of the following is the best representation of the structure of the carboxylate ion ?

(a) 

(b) 

(c) 

(d) None of these

4. The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C), and formic acid (D) is :
   (a) $A > B > C > D$ (b) $A > C > B > D$ (c) $B > A > D > C$ (d) $B > D > C > A$

5. Identify Z in sequence.

$$CH_3COONH_4 \xrightarrow[\text{(ii) } P_2O_5]{\text{(i) Heat}} Y \xrightarrow{H_2O(H^+)} Z$$

   (a) $CH_3CH_2CONH_2$ (b) CH_3CN
   (c) CH_3COOH (d) $(CH_3CO)_2O$

6. A halogen compound 'A' on hydrolysis with dilute alkali followed by acidification gives acetic acid. The compound X is :
   (a) $ClCH_2CH_2Cl$ (b) CH_3CHCl_2 (c) $ClCH_2CHCl_2$ (d) CH_3CCl_3

7. Which of the following statements are false about HCOOH ?
   (a) It is a stranger acid than CH_3COOH
   (b) It forms formyl chloride with PCl_5
   (c) It gives CO and H_2O on heating with conc. H_2SO_4
   (d) It reduces Tollen's reagent

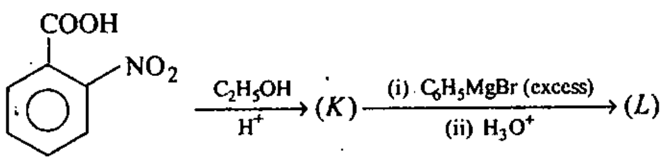
8. In a set of the given reactions, acetic acid yields a product C. Product C would be :

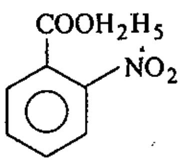
$$CH_3COOH + PCl_5 \longrightarrow A \xrightarrow[\text{Anhy. } AlCl_3]{C_6H_6} B \xrightarrow[\text{(ii) } H^+]{\text{(i) } C_2H_5MgBr/\text{ether}} C$$

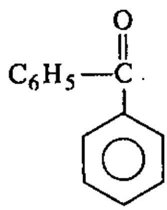
(a) $CH_3CH(OH)C_2H_5$ (b) $CH_3COC_6H_5$

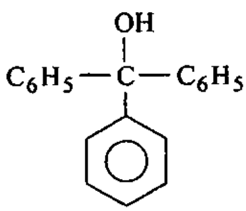
(c) $CH_3CH(OH)C_6H_5$ (d) $CH_3-\overset{\overset{\displaystyle C_2H_5}{|}}{C}-(OH)C_6H_5$

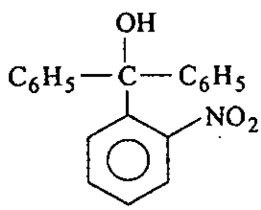
9. In the given reaction final compound (L) is :



(a) 

(b) 

(c) 

(d) 

10. The acid D obtained through the following sequence of reactions is :

$$C_2H_5Br \xrightarrow{\text{Alc. KOH}} A \xrightarrow[CCl_4]{Br_2} B \xrightarrow[\text{(excess)}]{KCN} C \xrightarrow{H_3O^+}$$

(a) succinic acid (b) malanic acid (c) maleic acid (d) oxalic acid

11. Carboxylic acid group can be detected by which test ?

(a) Sodium bisulphite test (b) Fehling's solution test

(c) Tollen's reagent (d) With $NaHCO_3$

12. Phenol is a weaker acid than acetic acid because :

(a) phenoxide ion is better stabilized by resonance than acetate ion

(b) acetate ion is better stabilized by resonance than phenoxide ion

(c) phenol is less soluble in water than acetic acid

(d) both phenoxide ion and acetate ion are equally stable

13. Which of the following is the weakest acid ?

(a) Cl_3CCOOH (b) $Cl_2CHCOOH$ (c) $ClCH_2COOH$ (d) CH_3COOH

14. Which of the following dicarboxylic acids contain the most acidic hydrogen ?

(a) Maleic acid (b) Fumaric acid (c) Succinic acid (d) Malonic acid

15. Which of the following sets of reagents X and Y will convert propanoic acid into alanine (an amino acid) ?

$$H_3C-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OH \xrightarrow{X} H_3C-\overset{\overset{\displaystyle Br}{|}}{CH}-\overset{\overset{\displaystyle O}{\|}}{C}-OH \xrightarrow{Y} H_3C-\overset{\overset{\displaystyle \overset{\oplus}{N}H_3}{|}}{CH}-C-COO^-$$

(a) $Br_2, NaNH_2$ (b) $Br_2/P, NaOH$
(c) $Br_2/P, NH_3$ (d) $Br_2/HBr, NaNH_2$

16. Identify Z in the following reaction sequence

$$CH_3I \xrightarrow[\text{Ether}]{\text{Mg}} X \xrightarrow[\text{ice}]{\text{Dry}} Y \xrightarrow[\text{(ii) } H_2O]{\text{(i) } P+Cl_2} Z$$

(a) CH_3COOH (b) CH_3MgI (c) CH_3COCl (d) $ClCH_2COOH$

17. $R-CH_2-CH_2OH$ can be converted into RCH_2CH_2COOH. The correct sequence of reagent is :

(a) PBr_3, KCN, H^+ (b) PBr_3, KCN, H_2
(c) KCN, H^+ (d) HCN, PBr_3, H^+

18. $(CH_3)_2C{=}CHCOCH_3$ can be oxidised to $(CH_3)_2C{=}CHCOOH$ by :

(a) Chromic acid (b) NaOI (c) Cu at 300°C (d) $KMnO_4$

19. The compound B is :

$$CH_3CH_2COOH \xrightarrow[\text{red P}]{Cl_2} A \xrightarrow{\text{Alc. KOH}} B$$

(a) CH_3CH_2OH (b) CH_3CH_2COCl
(c) $CH_2{=}CHCOOH$ (d) $CH_3-CHCl-COOH$

20. $A \xleftarrow[\text{HI}]{\text{red P}} CH_3COOH \xrightarrow{LiAlH_4} B$. What is not true for A and B ?

(a) A is hydrocarbon of general formula C_nH_{2n+2} while B belongs to alkanol
(b) A can be obtained by reducing CH_3CH_2Cl while B by its hydrolysis
(c) A is alkene while B is alcohol
(d) A and B both belong to different homologous series

21. In the reaction $A \xrightarrow{KCN} B \xrightarrow[\text{reflux}]{H_3\overset{\oplus}{O}} H_2C\begin{array}{l} \diagup COOH \\ \diagdown COOH \end{array}$

Identify A :

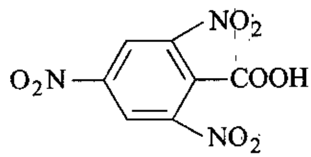
(a) $H_2C\begin{array}{l} \diagup OH \\ \diagdown CHOOH \end{array}$ (b) $H_2C\begin{array}{l} \diagup Br \\ \diagdown COOH \end{array}$

(c) $H_2C\begin{array}{l} \diagup NH_2 \\ \diagdown COOH \end{array}$ (d) All are correct

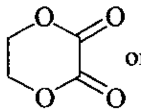
22. Give the order of sodalime decarboxylation of the following acid.

(I) CH_3COOH (II) $CH_2{=}CH-CH_2-COOH$

(III) $CH_2(COOH)_2$

(IV) 

(a) I > II > III > IV
(b) III > IV > II > I
(c) IV > III > II > I
(d) I > III > II > IV

23.  on saponification forms :

(a) $\underset{|}{\overset{OH}{CH_2}}$ ...

$$\begin{array}{ll} OH & OH \\ | & | \\ CH_2 & \!\!\!-CH_2 \end{array} \text{ and } OHC-CHO$$

(b) $OH-CH_2-CH_2-OH$ and $OHC-COOH$

(c) $$\begin{array}{ll} CH_2 & \!\!\!-CH_2 \\ | & | \\ OH & OH \end{array} \text{ and } HOOC-COOH$$

(d) $HO-CH_2-CH_2-COOH$ and $HCOOH$

24. Arrange the following compounds in decreasing order of acidity.
(i) $ClCH_2CH_2CH_2COOH$
(ii) $CH_3CHClCH_2COOH$
(iii) $CH_3CH_2CHClCOOH$
(a) I > II > III
(b) III > II > I
(c) I > III > II
(d) III > I > II

25. $H_3C-CH_2-COOH \xrightarrow[\Delta]{NaN_3 + \text{Conc. } H_2SO_4} X$ by reaction R_1

$H_3C-CH_2-COOH \xrightarrow[\Delta]{Br_2/P} Y$ by reaction R_2

Which is the correct alternate ?

	X	Y	R_1	R_2
(a)	$CH_3CH_2NH_2$	$H_3C-\underset{\underset{Br}{\vert}}{CH}COOH$	Schmidt	HVZ
(b)	$CH_3CH_2CONH_2$	CH_3CH_2COBr	Schmidt	HVZ
(c)	$CH_3CH_2NH_2$	CH_3CH_2COBr	Schmidt	HVZ
(d)	None of the above			

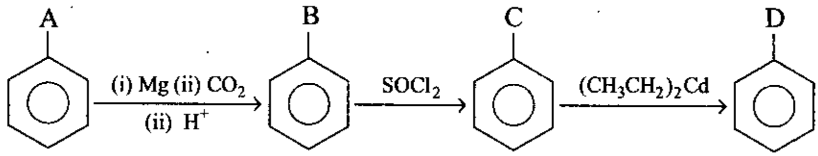
26. X and Y in the reaction sequence $R-C\equiv N \xrightarrow{H_3O^{\oplus}} X \xrightarrow{\text{diazomethane}} Y$, are given by the set :
(a) Carboxamide, Carbonitrile
(b) Carboxylic acid, Carbonitrile
(c) $RCOOH, RCOOCH_3$
(d) $RCONH_2, RCOCH_3$

27. Which of the following organic acid decolourises bromine water as well as forms anhydride ?
(a) $HOOC-COOH$
(b) $HOOC-CH_2-COOH$
(c) $$\begin{array}{c} H-C-COOH \\ \Vert \\ H-C-COOH \end{array}$$
(d) $$\begin{array}{c} H-C-COOH \\ \Vert \\ HOOC-C-H \end{array}$$

28. The compound which on reduction with $LiAlH_4$ gives two alcohols is :

(a) CH_3COOCH_3 (b) $CH_3COOC_2H_5$
(c) CH_3COCH_3 (d) CH_3CHO

29. Consider the following sequence of reactions.



Identify *A*, *B*, *C* and *D*.

(a) $—F, —COOH, —COCH_3, —OCH_2CH_2CH_3$
(b) $—CHO, —COOH, —COCl, —COCH_2CH_3$
(c) $—Br, COOH, —COCl, —COCH_2CH_3$
(d) $—Br, —COOH, —COCl, —CHO$

30. $CH_3COCl + C_2H_5O \xrightarrow{\text{Pyridine}} CH_3COOC_2H_5 + HCl$. The function of pyridine in the above reaction is :

(a) to absorb liberated HCl (b) to catalyse the reaction
(c) both (a) and (b) (d) none of these

31. CH_3COCl can react with :

(a) C_6H_5OH (b) $C_6H_5NH_2$
(c) $C_6H_4\begin{cases}OH\\COOH\end{cases}$ (*ortho*) (d) all of these

32. The end product in the reaction is :

$$CH_3CONH_2 \xrightarrow{P_2O_5} B \xrightarrow{4[H]} C \xrightarrow{HNO_2} D \xrightarrow[300^\circ]{Cu} E$$

(a) CH_3CHO (b) CH_3COCH_3
(c) $CH_3COOC_2H_5$ (d) $(CH_3CO)_2O$

33. Hofmann bromamide reaction involves the intermediate formation of :

(a) a species with electron deficient carbon
(b) a species with electron deficient nitrogen
(c) a species with negative charge
(d) a free radical species

34. $RCOOAg + Br_2 \xrightarrow[\Delta]{CCl_4} R—Br + AgBr + CO_2$. This reaction is called :

(a) Wurtz reaction (b) Hunsdiecker reaction
(c) Friedel-Crafts reaction (d) Kolbe reaction

35. Main product of the reaction is : $CH_3CONH_2 + HNO_2 \longrightarrow$ Product

(a) CH_3NH_2 (b) $CH_3CH_2NH_2$ (c) CH_3COOH (d) CH_3OH

36. The reaction, $CH_3COOC_2H_5 \xrightarrow[4\,[H]]{Na + C_2H_5OH} C_2H_5OH + CH_3CH_2OH$, is called :

(a) Claisen reduction (b) Claisen condensation

(c) Bouveault-Blanc reduction (d) Tischenko reduction

37. The reaction $CH_3CONH_2 \xrightarrow{NaOBr}$, gives :

(a) CH_3Br (b) CH_4 (c) CH_3OBr (d) CH_3NH_2

38. The reaction of acetaldehyde in the presence of $Al(OC_2H_5)_3$ produces :

(a) $CH_3CH(OH)CH_2CHO$ (b) $CH_3CH{=}CH{-}CHO$

(c) $CH_3COOC_2H_5$ (d) No reaction

39. Methyl acetate on treating with excess of C_2H_5MgBr produces :

(a) $\begin{array}{c} CH_3 \\ | \\ CH_3{-}C{-}OH \\ | \\ CH_3 \end{array}$ (b) $\begin{array}{c} C_2H_5 \\ | \\ CH_3{-}C{-}OH \\ | \\ C_2H_5 \end{array}$

(c) $\begin{array}{c} C_2H_5 \\ | \\ C_2H_5{-}C{-}OH \\ | \\ C_2H_5 \end{array}$ (d) $\begin{array}{c} CH_3 \\ | \\ CH_3{-}C{-}OH \\ | \\ C_2H_5 \end{array}$

40. In a set of reactions, propionic acid yielded a compound (D).

$$CH_3CH_2COOH \xrightarrow{SOCl_2} (B) \xrightarrow{NH_3} (C) \xrightarrow[Br_2]{KOH} (D)$$

The structure of (D) would be :

(a) $CH_3CH_2NHCH_3$ (b) $CH_3CH_2NH_2$

(c) $CH_3CH_2CH_2NH_2$ (d) $CH_3CH_2CONH_2$

41. The end product in the following series of reaction is :

$$CH_3COOH \xrightarrow{NH_3} (A) \xrightarrow{Heat} (B) \xrightarrow{P_2O_5} (C)$$

(a) CH_4 (b) CH_3OH

(c) acetonitrile (d) ammonium acetate

42. The end product in the following sequence is :

$$\text{Acetamide} \xrightarrow{P_2O_5} (A) \xrightarrow{4H} (B)$$

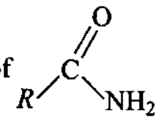
(a) CH_3NH_2 (b) $C_2H_5NH_2$ (c) CH_3CN (d) CH_3COONH_4

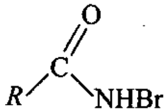
43. $C_6H_5COOCH_3 + {}^{18}OH^- \longrightarrow A + B$

In the above reaction, products A and B respectively are :

(a) $\begin{array}{c} O \\ \| \\ C_3H_5C{-}O^- \end{array} + CH_3O^{18}H$ (b) $\begin{array}{c} O^{18} \\ \| \\ C_2H_5{-}C{-}\overline{O}^{18} \end{array} + CH_3OH$

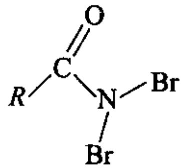
(c) $\begin{array}{c} O \\ \| \\ C_2H_5{-}C{-}\overline{O}^{18} \end{array} + CH_3OH$ (d) $\begin{array}{c} O^{18} \\ \| \\ C_2H_5{-}C{-}O^- \end{array} + CH_3OH$

44. The reaction of  with a mixture of Br_2 and KOH given R—NH_2 as a product. The intermediates involved in this reaction are :

(a) 

(b) $R-N=C=O$

(c) R—NHBr

(d) 

45. In which of the following reactions propionic anhydride is not obtained ?

(a) $CH_3CH_2COOH \xrightarrow{P_2O_5/\Delta}$

(b) $CH_3CH_2COCl + CH_3CH_2COONa \longrightarrow$

(c) $CH_3CH_2COOH + (CH_3CH_2CO)_2O \xrightarrow{\Delta}$

(d) $CH_3CH_2COOH + (C_3H_7CO)_2O \xrightarrow{\Delta}$

46. $Z = ?$ for following reaction :

$$CH_3CHO \xrightarrow[\text{dil. } H_2SO_4]{MnO_4^-} X \xrightarrow{SOCl_2} Y \xrightarrow{CH_3COONa} Z$$

(a) CH_3CHO (b) $(CH_3CO)_2O$

(c) $(CH_3)_2CHCH_2COOH$ (d) $(CH_2ClCO)_2O$

47. Which one of the following is an example of Rosenmund's reduction ?

(a) $CH_3COCl \xrightarrow[\text{Pd-BaSO}_4]{H_2} CH_3CHO + HCl$

(b) $CH_3C{\equiv}N \xrightarrow[\text{(ii) } H_2O/\Delta]{\text{(i) } SnCl_2\text{—}HCl} CH_3CHO + NH_4Cl$

(c) $CH_3COOH \xrightarrow{LiAlH_4} CH_3CH_2OH + H_2O$

(d) $CH_3COCl \xrightarrow{LiAlH_4} CH_3CH_2OH + HCl$

48. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is :

(a) MeCOOCOMe (b) MeCHO (c) MeCOOMe (d) MeCOCl

49. In a reaction,

$$(A) \xrightarrow{NH_3} (B) \xrightarrow{\text{Heat}} (C) \xrightarrow{P_2O_5} C_2H_5CN$$

(A), (B) and (C) are :

(a) CH_3COOH, CH_3COONH_4 and CH_3CONH_2

(b) CH_3COCl, CH_3CONH_2 and CH_3COONH_4

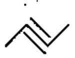
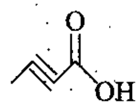
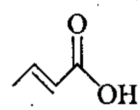
(c) $C_2H_5COOH, C_2H_5COONH_4$ and $C_2H_5CONH_2$
(d) $C_2H_5CONH_4, C_2H_5CONH_2$ and C_2H_5COOH

50. Which of the following esters cannot undergo Claisen self condensation ?
(a) $CH_3CH_2CH_2CH_2COOC_2H_5$ (b) $C_6H_5COOC_2H_5$
(c) $C_6H_{11}CH_2COOC_2H_5$ (d) $C_6H_5CH_2COOC_2H_5$

LEVEL-2

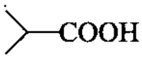
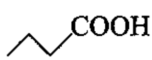
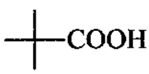
1. $H_3C—C{\equiv}CH \xrightarrow{CH_3MgBr} CH_4 + A \xrightarrow[H_3\overset{\oplus}{O}]{CO_2} B$

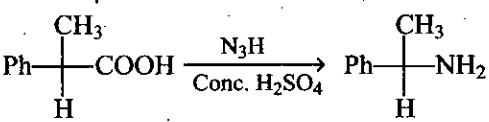
B will be :

(a)  (b)  (c)  (d) 

2. Consider the given reaction; $RCOOAg \xrightarrow[CCl_4]{Br_2/\Delta} R—Br$

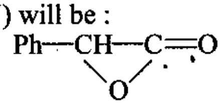
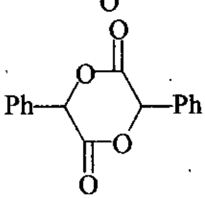
Which one of the following acids will give maximum yield of $R—Br$ in the above reaction?

(a)  (b) 
(c)  (d) All will give same yield

3. 

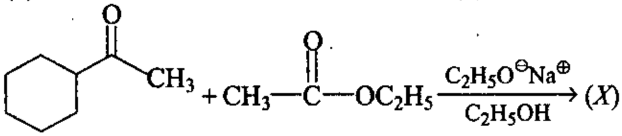
The above reaction is known as :
(a) Schmidt reaction (b) Curtius reaction
(c) Hofmann rearrangement (d) Lossen rearrangement

4. $Ph—\underset{\underset{OH}{|}}{CH}—\overset{\overset{O}{\|}}{C}—OH \xrightarrow{\Delta} (X)$

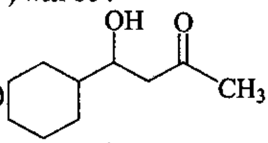
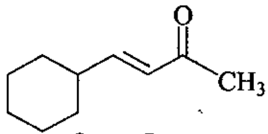
(X) will be :
(a)  (b) $Ph—CH{=}C{=}O$
(c)  (d) none of these

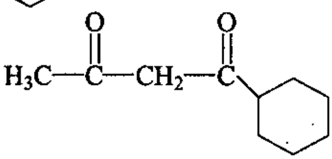
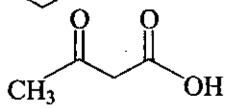
5. $Ph—CHO + Ph—CHO \xrightarrow{Na_2[Fe(CO)_4]} Ph—\overset{\overset{\large O}{||}}{C}—O—CH_2—Ph$. This reaction is known as :

(a) Claisen rearrangement (b) Tischenko reaction
(c) Perkin reaction (d) Cannizzaro reaction

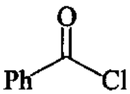
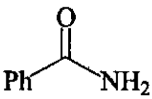
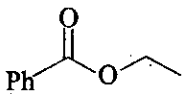
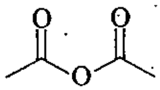
6. 

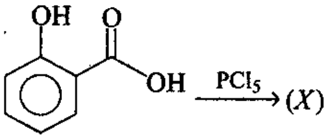
(X) will be :

(a)  (b) 

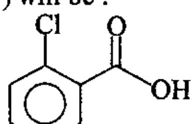
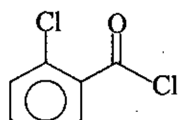
(c)  (d) 

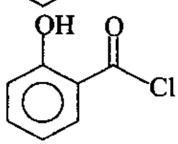
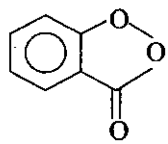
7. Which one of the following compounds gives carboxylic acid with HNO_2?

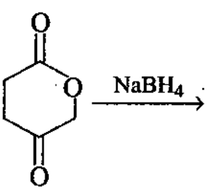
(a)  (b)  (c)  (d) 

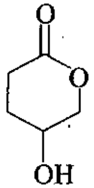
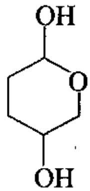
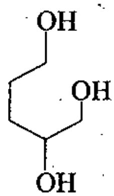
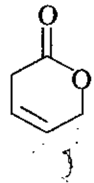
8. 

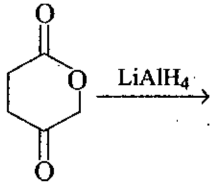
(X) will be :

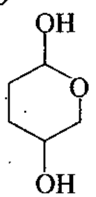
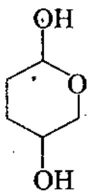
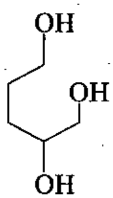
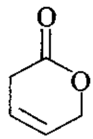
(a)  (b) 

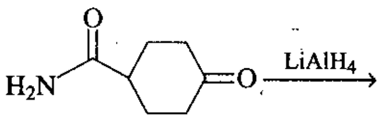
(c)  (d) 

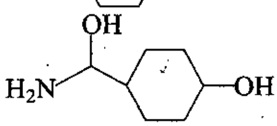
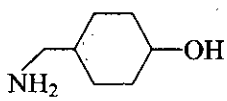
9. 

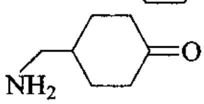
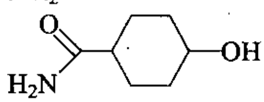
(a)  (b)  (c)  (d) 

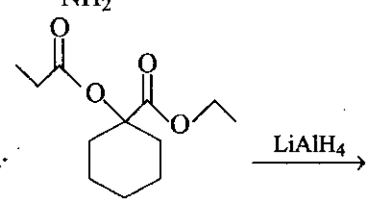
10. 

(a)  (b)  (c)  (d) 

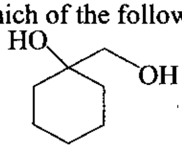
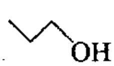
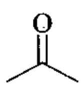
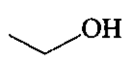
11. 

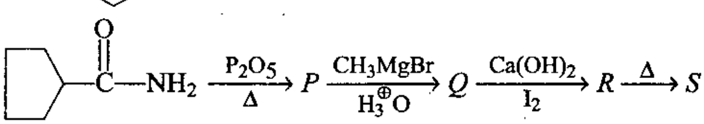
(a)  (b) 

(c)  (d) 

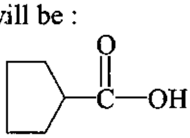
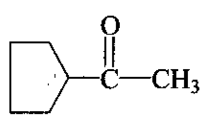
12. 

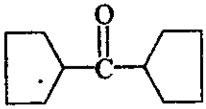
Which of the following will not form?

(a)  (b)  (c)  (d) 

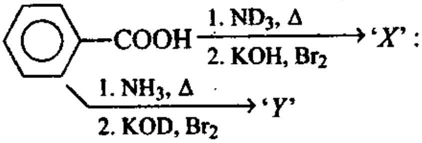
13. 

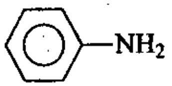
S will be :

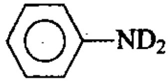
(a)  (b) 

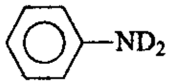
(c) 

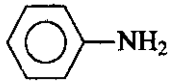
(d) 

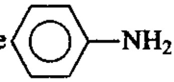
14. 

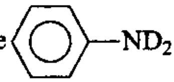
(a) 'X' is 

and Y is 

(b) 'X' is 

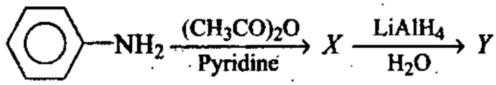
and Y is 

(c) Both are 

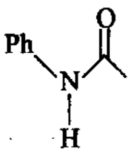
(d) Both are 

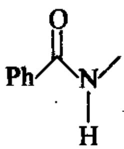
15. PhCOOH and Ph—CH_3 can be separated by :

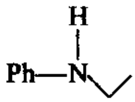
(a) $NaHCO_3$ (b) aq. $NaHCO_3$ + *n*-Hexane
(c) H_2O (d) *n*-Hexane

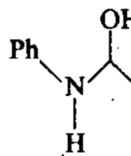
16. 

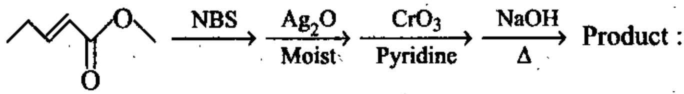
Find out structure of Y :

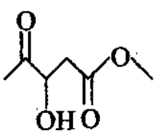
(a) 

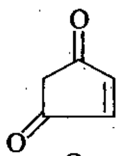
(b) 

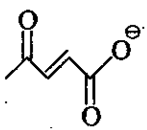
(c) 

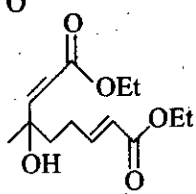
(d) 

17. 

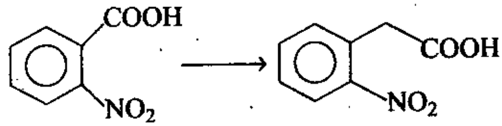
(a) 

(b) 

(c) 

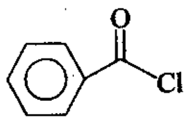
(d) 

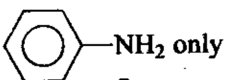
18. The correct sequence of reagents for the following conversion is :

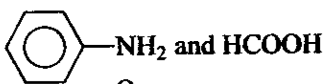


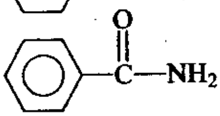
(a) $\xrightarrow{SOCl_2} \xrightarrow[H_2O]{Ag} \xrightarrow{CH_2N_2}$ (b) $\xrightarrow{SOCl_2} \xrightarrow{CH_2N_2} \xrightarrow{Ag, H_2O}$

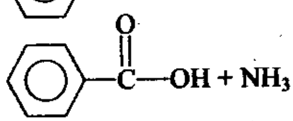
(c) $\xrightarrow{CH_2N_2} \xrightarrow{SOCl_2} \xrightarrow[H_2O]{Ag}$ (d) $\xrightarrow[H_2O]{Ag} \xrightarrow{SOCl_2} \xrightarrow{CH_2N_2}$

19.  $\xrightarrow{NaN_3} X \xrightarrow[H_2O]{\Delta}$ Product :

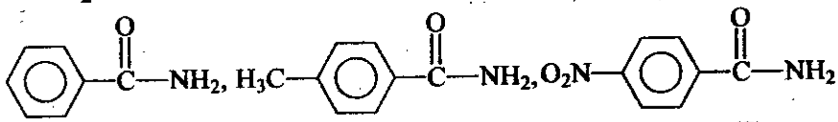
(a) 

(b) 

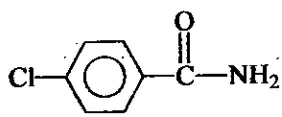
(c) 

(d) 

20. Arrange the following amides according to their relative reactivity when treated with Br_2 in excess of strong base.



(*P*) (*Q*) (*R*)



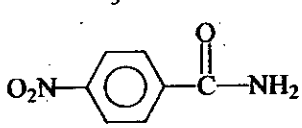
(*S*)

(a) $P > Q > R > S$ (b) $R > S > P > Q$

(c) $Q > P > S > R$ (d) $S > P > Q > R$

21. Which of the following compounds cannot give Hofmann rearrangement?

(a) $Ph-C(CH_3)_2-C(=O)-NH_2$ (b) $CH_3-CH_2-C(=O)-NH-Ph$

(c)  (d) $Ph-C(=O)-NH_2$

22. $H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-OH+C_2H_5\overset{18}{O}H \xrightarrow{\text{Conc. } H_2SO_4} (X)$

$H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-OH+(CH_3)_3C-\overset{18}{O}H \xrightarrow{\text{Conc. } H_2SO_4} (Y)$

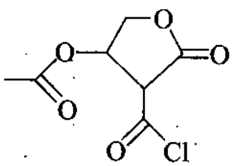
In the above reaction (X) and (Y) are respectively :

(a) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-\overset{18}{O}-C_2H_5$ and $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-O-\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}-CH_3$

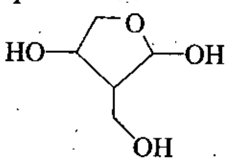
(b) $H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-\overset{18}{O}-C_2H_5$ and $H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-\overset{18}{O}-\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}-CH_3$

(c) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-O-C_2H_5$ and $H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-O-\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}-CH_3$

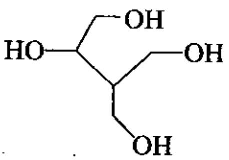
(d) $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-O-C_2H_5$ and $CH_3-\overset{\overset{\displaystyle O}{\|}}{C}-\overset{18}{O}-\underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{C}}-CH_3$

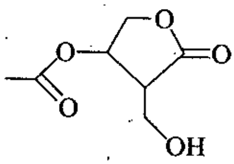
23.  $\xrightarrow{NaBH_4}$ Product

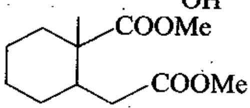
The product is :

(a) 

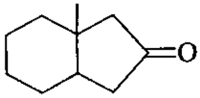
(b) CH_3-CH_2-OH

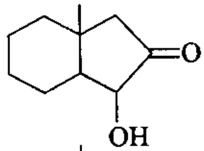
(c) 

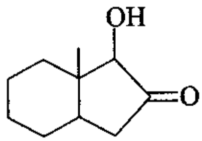
(d) 

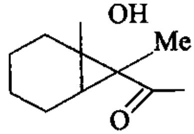
24.  $\xrightarrow{\text{Na, } NH_3\ (l)}$ Product

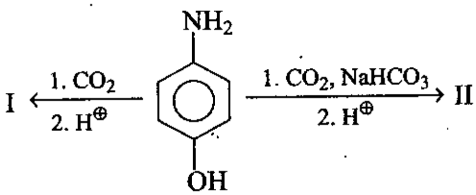
The main product is :

(a) 

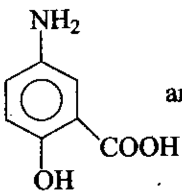
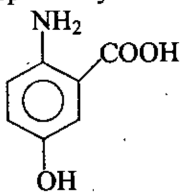
(b) 

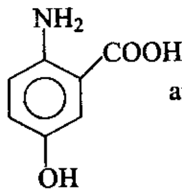
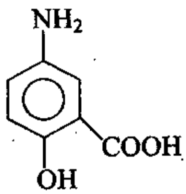
(c) 

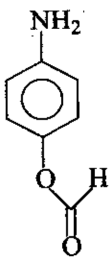
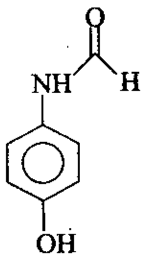
(d) 

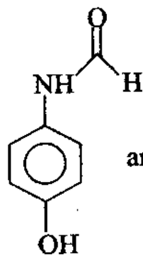
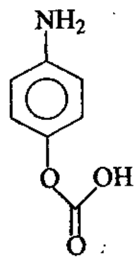
25. 

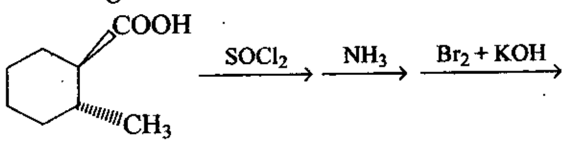
Product I and II are respectively :

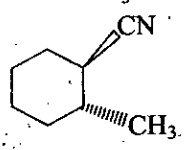
(a)  and 

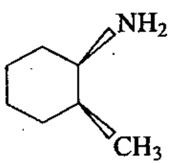
(b)  and 

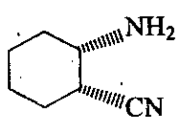
(c)  and 

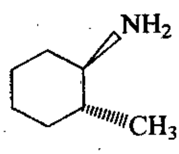
(d)  and 

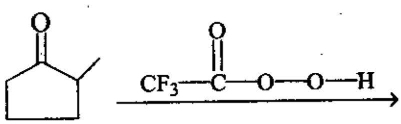
26.  Product :

(a) 

(b) 

(c) 

(d) 

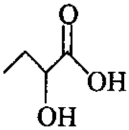
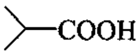
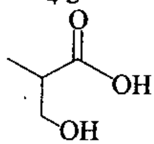
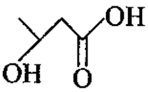
27.  A (Major) + B (Minor)

Product A and B are :

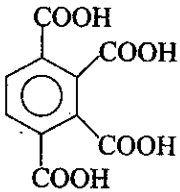
(a) Metamers (b) Position isomer

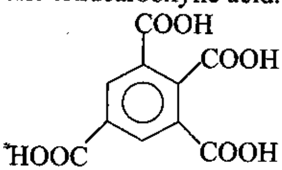
(c) Enantiomer (d) Diastereomers

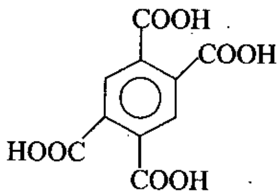
28. An optically active compound 'X' having molecular formula $C_4H_8O_3$. It evolves CO_2 with $NaHCO_3$. 'X' on reaction with $LiAlH_4$ give achiral compound. 'X' is :

(a)  (b)  (c)  (d) 

29. There are three isomeric tetracarboxylic acid.

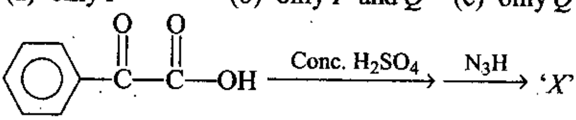

(P)


(Q)

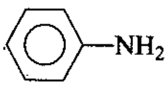

(R)

Which of these form two isomeric monoanhydrides?

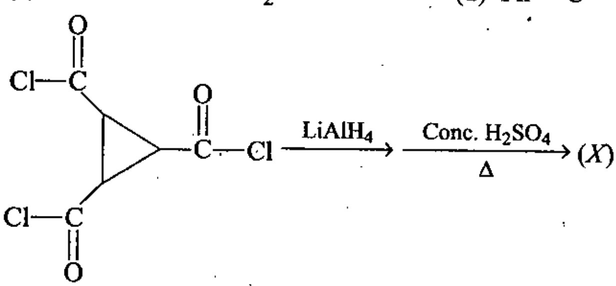
(a) only P (b) only P and Q (c) only Q (d) P, Q and R

30. 

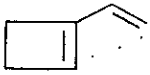
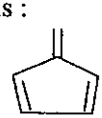
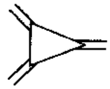
The final product 'X' is :

(a) $Ph-\overset{O}{\overset{\|}{C}}-NH_2$ (b) 

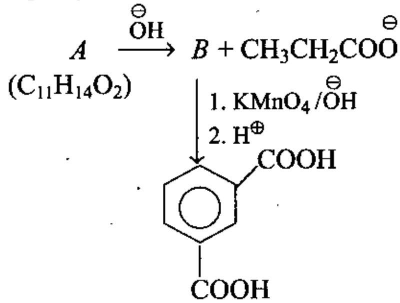
(c) $Ph-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-NH_2$ (d) $Ph-\overset{O}{\overset{\|}{C}}-NH-NH_2$

31. 

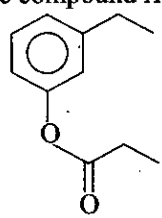
The final product (X) is :

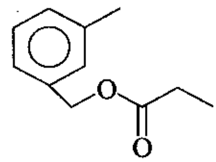
(a)  (b)  (c)  (d) 

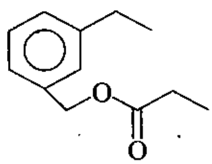
32. Consider the following sequence of reaction

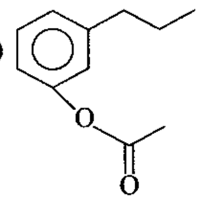


The compound A is :

(a) 

(b) 

(c) 

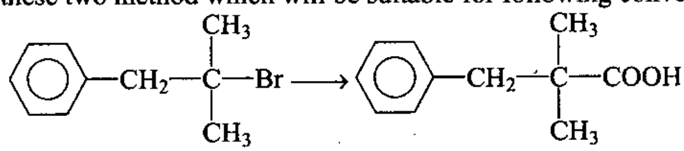
(d) 

33. Following two methods are used for the preparation of acid

$$(I) \rightarrow R\text{—Br} \xrightarrow[\text{ether}]{\text{Mg}} R\text{MgBr} \xrightarrow[2.\ H_3\overset{\oplus}{O}]{1.\ CO_2} R\text{—COOH}$$

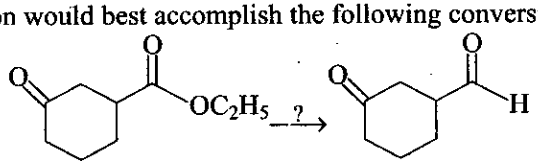
$$(II) \rightarrow R\text{—Br} \xrightarrow{\text{NaCN}} R\text{—CN} \xrightarrow{H_3\overset{\oplus}{O}} R\text{—COOH}$$

Out of these two method which will be suitable for following conversion?



(a) Both I and II (b) Only I (c) Only II (d) None of these

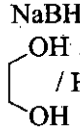
34. Which reaction would best accomplish the following conversion?

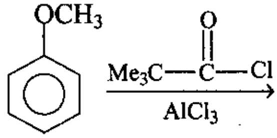


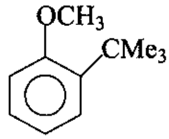
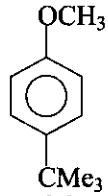
(a) $LiAlH_4$, Collins reagent

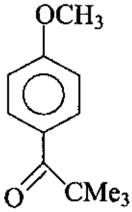
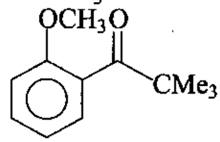
(b) $NaBH_4$, Jones reagent

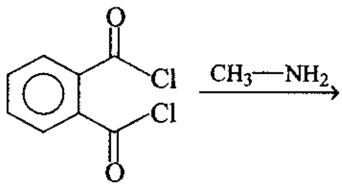
(c) $NaBH_4, CrO_3, H^{\oplus}$

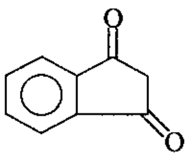
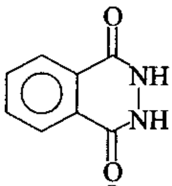
(d)  $/ H^{\oplus}$, $NaBH_4$, $H_3\overset{\oplus}{O}$

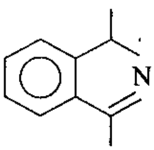
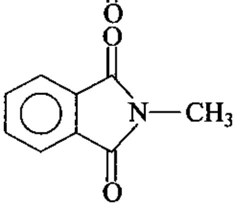
35.  Major product :

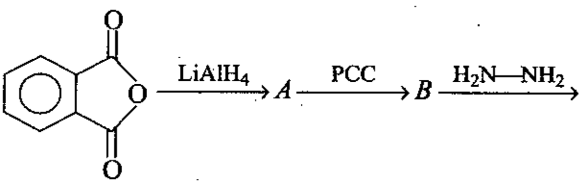
(a) 
(b) 

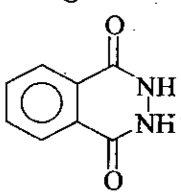
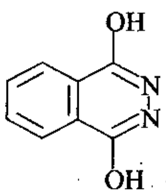
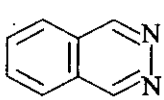
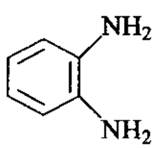
(c) 
(d) 

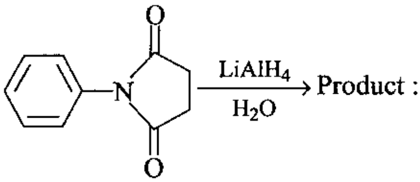
36.  Product :

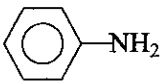
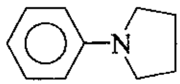
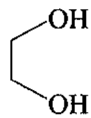
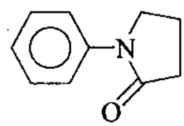
(a) 
(b) 

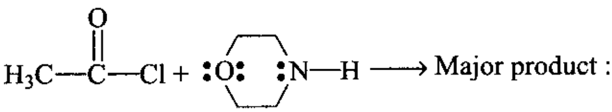
(c) 
(d) 

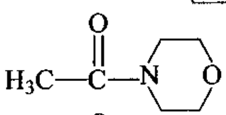
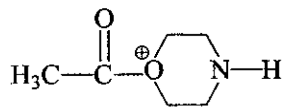
37.  C ; Product C is :

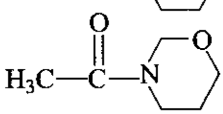
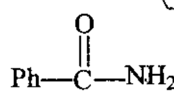
(a) 
(b) 
(c) 
(d) 

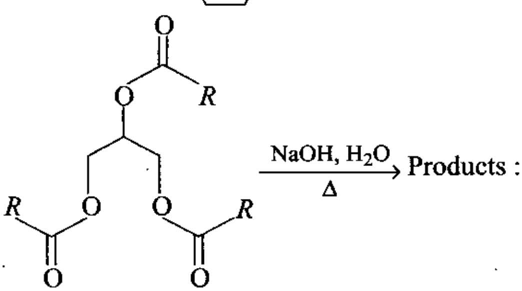
38. 

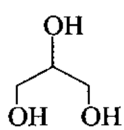
(a)  (b)  (c)  (d) 

39. 

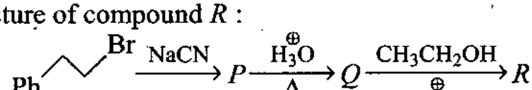
(a)  (b) 

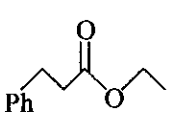
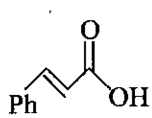
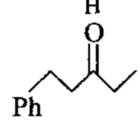
(c)  (d) 

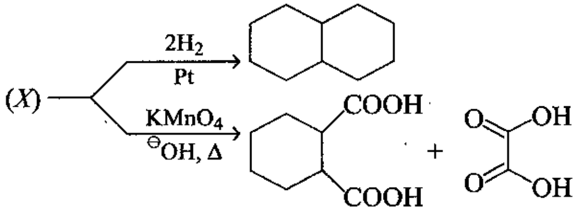
40. 

(a) $RCOO^{\ominus}Na^{\oplus}$ (b)  (c) Both (a) and (b) (d) None of these

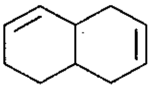
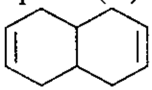
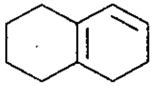
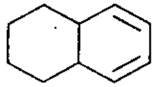
41. Find out structure of compound R :

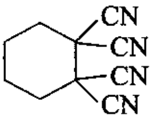


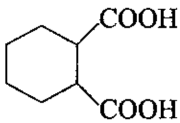
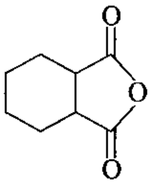
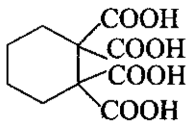
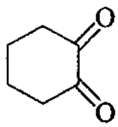
(a)  (b)  (c)  (d) None of these

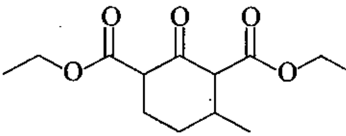
42. 

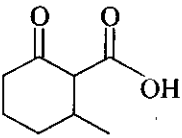
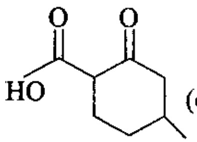
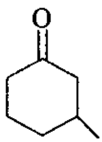
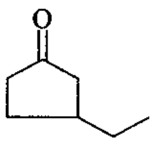
Find out structure of compound (X) :

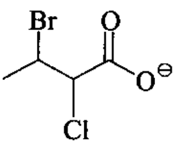
(a)  (b)  (c)  (d) 

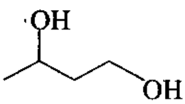
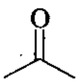
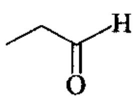
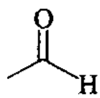
43.  $\xrightarrow[2.\ \Delta]{1.\ H_3\overset{\oplus}{O}}$ (P); Product (P) will be :

(a)  (b)  (c)  (d) 

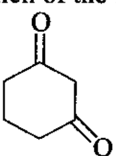
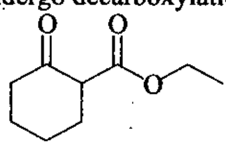
44.  $\xrightarrow[2.\ \Delta]{1.\ \overset{\oplus}{H}/H_2O}$ Product :

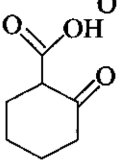
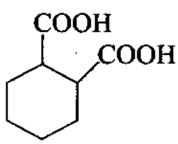
(a)  (b)  (c)  (d) 

45.  $\xrightarrow[-CO_2]{\Delta} A \xrightarrow{HCl} B \xrightarrow{aq.\ KOH} C$; Product C is :

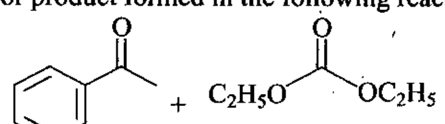
(a)  (b)  (c)  (d) 

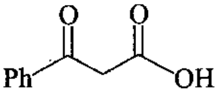
46. Which of the following compounds will undergo decarboxylation on heating?

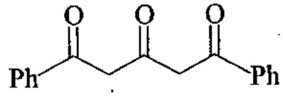
(a)  (b) 

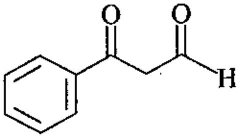
(c)  (d) 

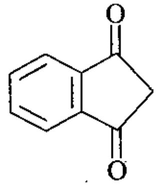
47. Major product formed in the following reaction sequence is :

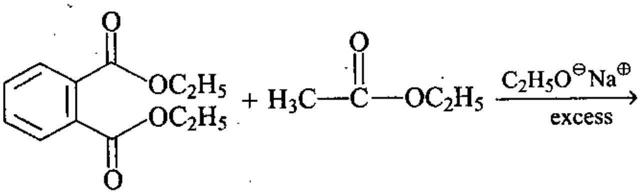
 $\xrightarrow{C_2H_5O^{\ominus}Na^{\oplus}}$ $\xrightarrow{H^{\oplus}/H_2O}$

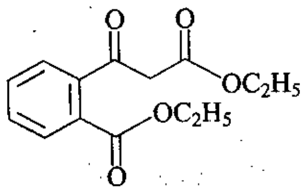
(a) 

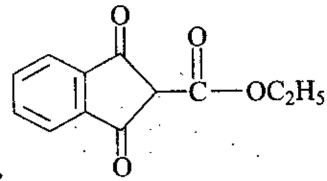
(b) 

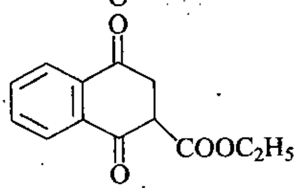
(c) 

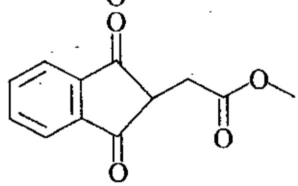
(d) 

48.  Major product :

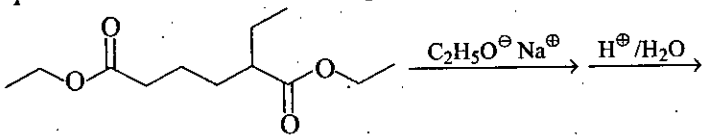
(a) 

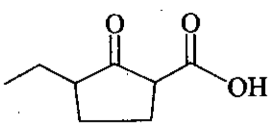
(b) 

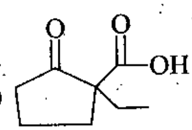
(c) 

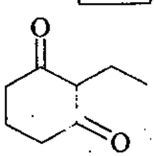
(d) 

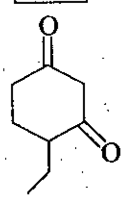
49. Predict product formed in the following reaction :



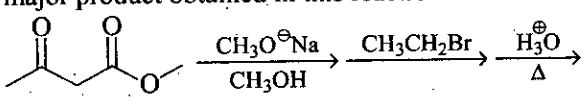
(a) 

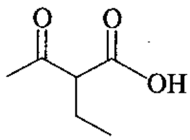
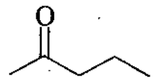
(b) 

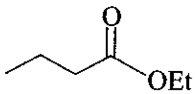
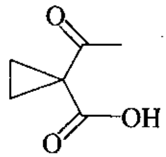
(c) 

(d) 

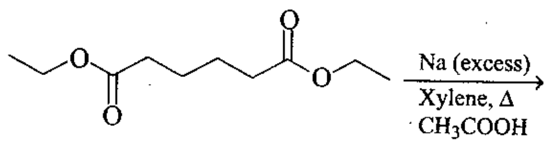
50. What is the major product obtained in this reaction?

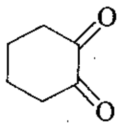
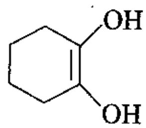
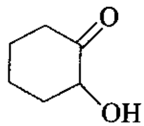
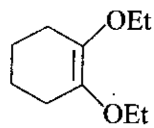


(a) 
(b) 

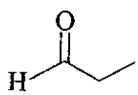
(c) 
(d) 

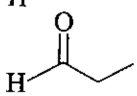
51. What is the major product obtained from the following reaction?

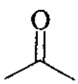


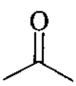
(a) 
(b) 
(c) 
(d) 

52. Which of the following would be the best synthesis of 2, 2-dimethylpropanoic acid?

(a)  $\xrightarrow[H_3\overset{\oplus}{O}]{CH_3MgBr} \xrightarrow{SOBr_2} \xrightarrow{Mg/Et_2O} \xrightarrow[H_3\overset{\oplus}{O}]{CO_2}$

(b)  $\xrightarrow[H_3\overset{\oplus}{O}]{CH_3MgBr} \xrightarrow{SOBr_2} \xrightarrow{KCN} \xrightarrow{H_3\overset{\oplus}{O}}$

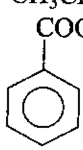
(c)  $\xrightarrow[H_3\overset{\oplus}{O}]{CH_3MgBr} \xrightarrow{SOBr_2} \xrightarrow{Mg/Et_2O} \xrightarrow[H_3\overset{\oplus}{O}]{CO_2}$

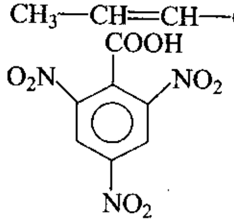
(d)  $\xrightarrow[H_3\overset{\oplus}{O}]{CH_3MgBr} \xrightarrow{SOBr_2} \xrightarrow{KCN} \xrightarrow{H_3\overset{\oplus}{O}}$

53. Which of the following can decarboxylated most easily?

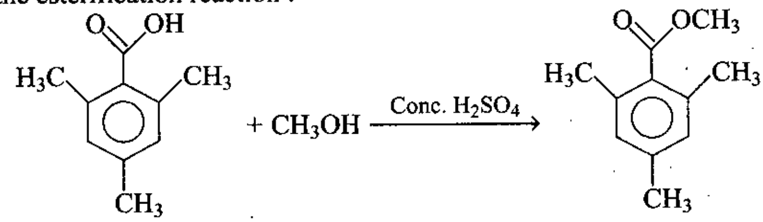
(a) $CH_3CH_2CH_2COOH$

(b) $CH_3—CH=CH—COOH$

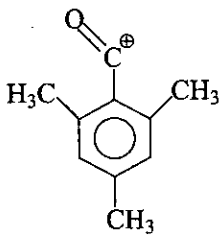
(c) 

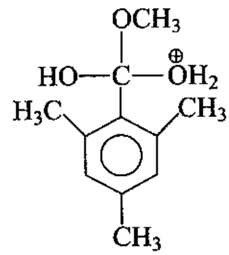
(d) 

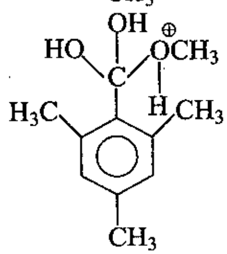
54. In the esterification reaction :

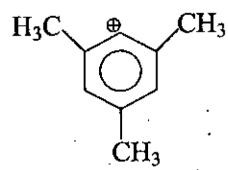


Which of the following is formed as an intermediate?

(a) 

(b) 

(c) 

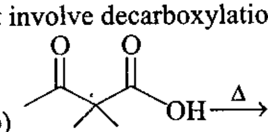
(d) 

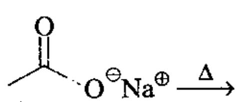
55. Which of the following will not produce benzoic acid by oxidation with alkaline $KMnO_4$?

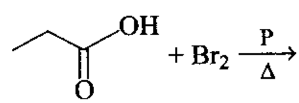
(a) Ph—CH_3 (b) Ph—CH_2—Cl (c) Ph—CH_2CH_3 (d) Ph—C(CH_3)$_3$

56. Which of the following reactions does not involve decarboxylation?

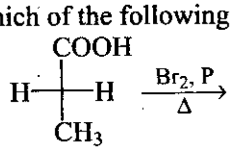
(a) $CH_3COOAg + Br_2 \xrightarrow[\Delta]{CCl_4}$

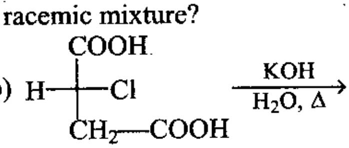
(b) 

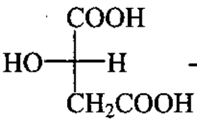
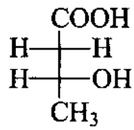
(c) 

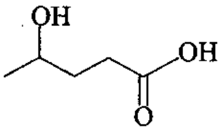
(d) 

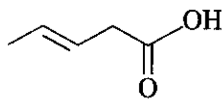
57. Which of the following reaction will give racemic mixture?

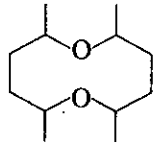
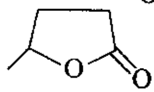
(a) 

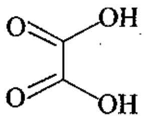
(b) 

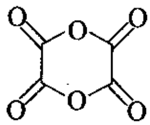
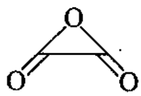
(c)  $\xrightarrow{PCl_5}$ (d)  $\xrightarrow{\Delta}$

58.  $\xrightarrow[\Delta]{H_2SO_4}$ Product :

(a) $H_2C{=}CH{-}CH_2{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}OH$ (b) 

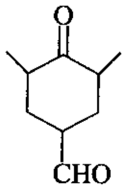
(c)  (d) 

59.  $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$ Product :

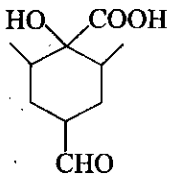
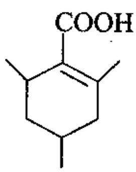
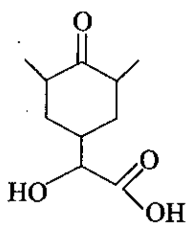
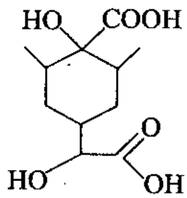
(a)  (b)  (c) CO_2 and CO (d) HCOOH

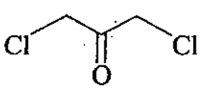
60. H—COOH and H—CHO can be distinguished by :

(a) Tollen's reagent (b) Fehling's solution
(c) $NaHCO_3$ solution (d) $HgCl_2$ solution

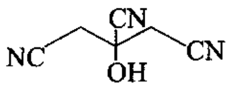
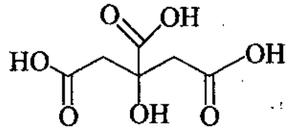
61.  + HCN $\longrightarrow A \xrightarrow[\Delta]{H_3\overset{\oplus}{O}} B$

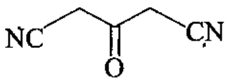
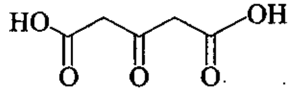
The end product B is :

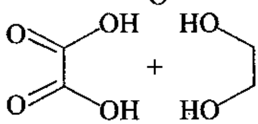
(a)  (b)  (c)  (d) 

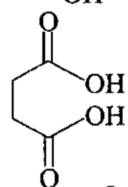
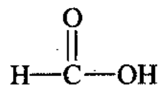
62.  $\xrightarrow{HCN} A \xrightarrow[\text{(excess)}]{KCN} B \xrightarrow{H_3\overset{\oplus}{O}} C$

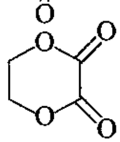
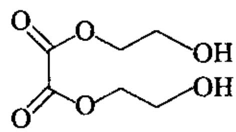
The end product C is :

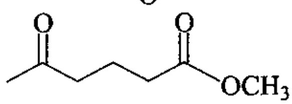
(a) 
(b) 

(c) 
(d) 

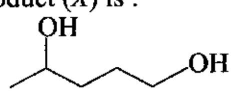
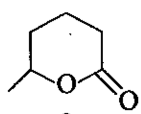
63.  $\xrightarrow[\Delta]{H_2SO_4}$

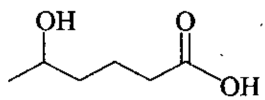
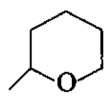
(a) 
(b) 

(c) 
(d) 

64.  $\xrightarrow{NaBH_4}$ (X)

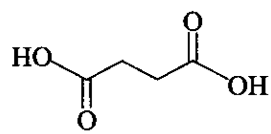
Product (X) is :

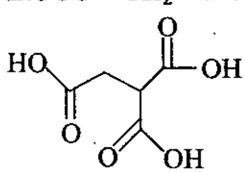
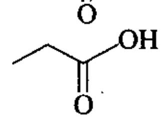
(a) 
(b) 

(c) 
(d) 

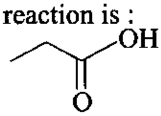
65. $H_2C(COOEt)_2 \xrightarrow[2.\ Br-CH_2-COOEt]{1.\ EtO^{\ominus}Na^{\oplus}} A \xrightarrow[2.\ H_3^{\oplus}O]{1.\ KOH,\ \Delta} B$

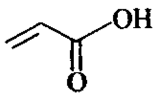
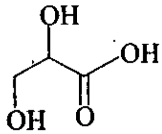
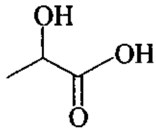
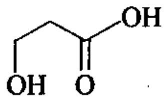
The end product B will be :

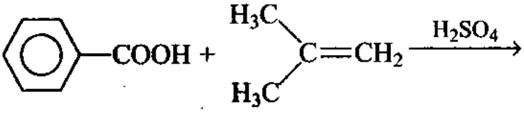
(a) $EtOOC-CH_2-HC(COOEt)_2$
(b) 

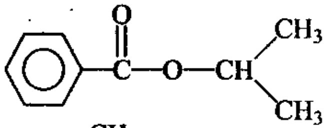
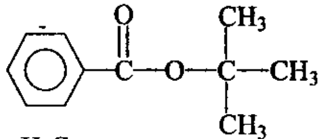
(c) 
(d) 

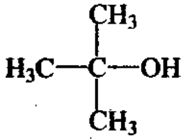
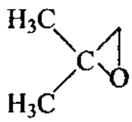
66. The end product of reaction is :

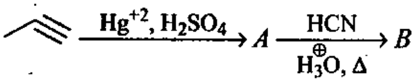
 $\xrightarrow[H_2O]{P + Cl_2} \xrightarrow[\Delta]{KOH\ (alc.)}$

(a)  (b)  (c)  (d) 

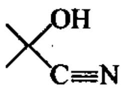
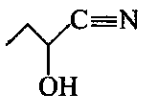
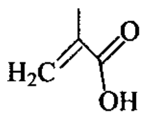
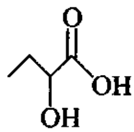
67.  (X); (X) will be :

(a)  (b) 

(c)  (d) 

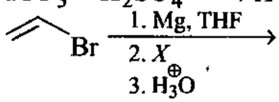
68. 

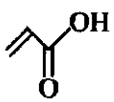
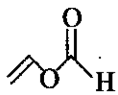
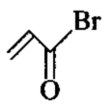
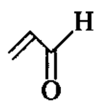
The end product *B* will be :

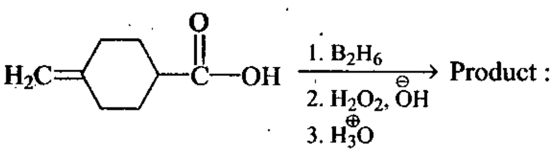
(a)  (b)  (c)  (d) 

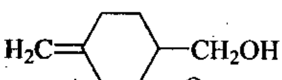
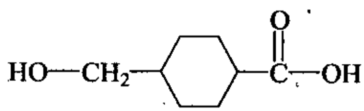
69. Consider the following sequence of reaction :

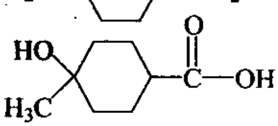
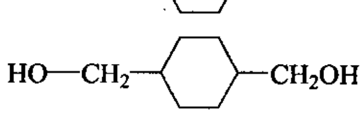
$$BaCO_3 + H_2SO_4 \longrightarrow X \text{ (gas)}$$

 Y; Y will be :

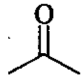
(a)  (b)  (c)  (d) 

70.  Product :

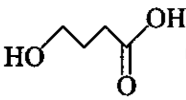
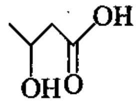
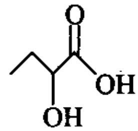
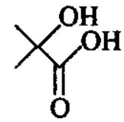
(a)  (b) 

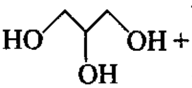
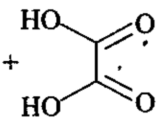
(c)  (d) 

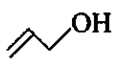
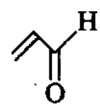
71. Consider the following sequence of reaction :

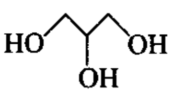
$\underset{(C_4H_6O_3)}{A} \xrightarrow{CrO_3} B \xrightarrow{\text{warm}}$  $+ CO_2$

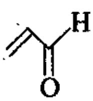
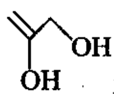
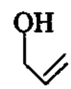
The compound A is :

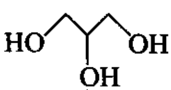
(a)  (b)  (c)  (d) 

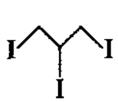
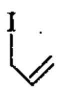
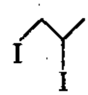
72.  +  $\xrightarrow{260°C}$ (X); (X) will be :

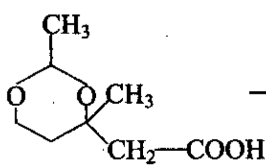
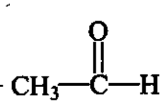
(a) HCOOH (b)  (c)  (d) 

73.  $\xrightarrow[\Delta]{KHSO_4}$ (P); (P) will be :

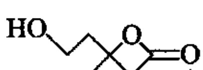
(a)  (b)  (c)  (d) 

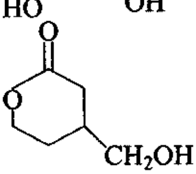
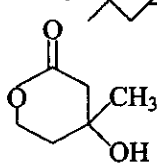
74.  $\xrightarrow[\text{(excess)}]{HI}$ (A); Product (A) will be :

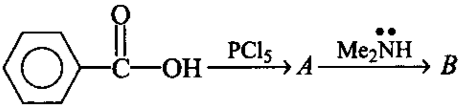
(a)  (b)  (c)  (d) 

75.  $\xrightarrow{H_3\overset{\oplus}{O}}$ $A +$ 

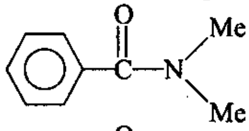
Identify correct structure of A :

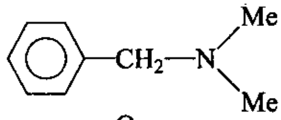
(a)  (b) 

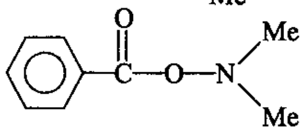
(c)  (d) 

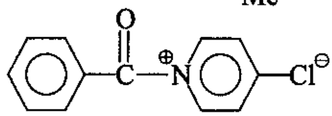
76. 

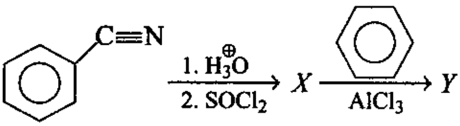
Find structure of compound B :

(a) 

(b) 

(c) 

(d) 

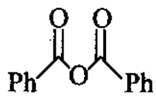
77. 

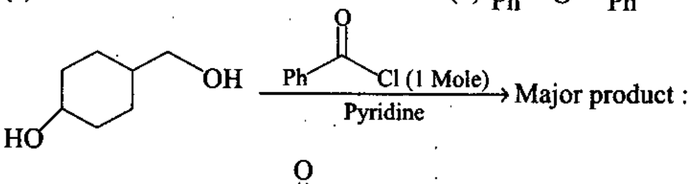
The structure of compound Y :

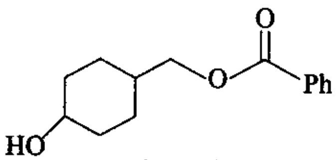
(a) $Ph—\overset{O}{\overset{||}{C}}—O—Ph$

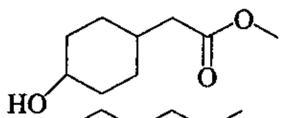
(b) $Ph—\overset{O}{\overset{||}{C}}—NH—Ph$

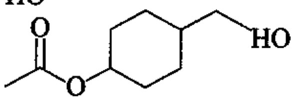
(c) $Ph—\overset{O}{\overset{||}{C}}—Ph$

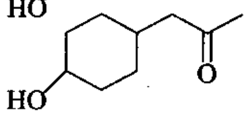
(d) 

78. 

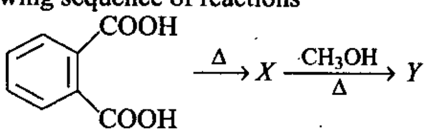
(a) 

(b) 

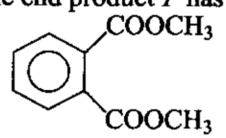
(c) 

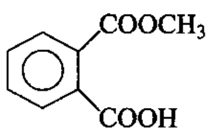
(d) 

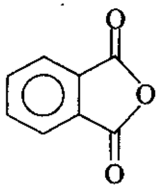
79. Consider the following sequence of reactions

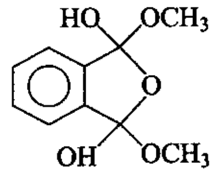


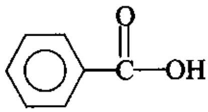
The end product Y has structure :

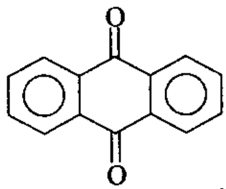
(a) 

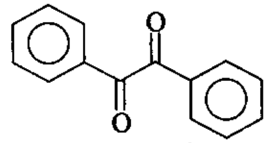
(b) 

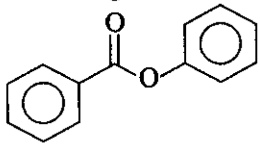
(c) 

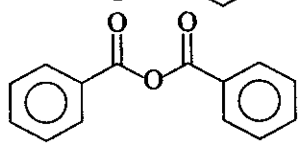
(d) 

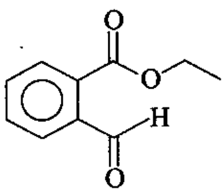
80.  $\xrightarrow[\Delta]{P_2O_5}$ (*X*); Identify product (*X*) :

(a) 

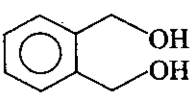
(b) 

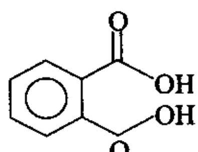
(c) 

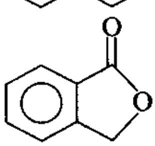
(d) 

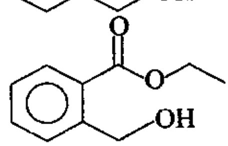
81.  $\xrightarrow[2.\ H_3\overset{\oplus}{O},\ \Delta]{1.\ NaBH_4}$ Product

Identify structure of major product :

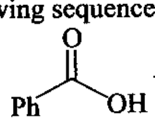
(a) 

(b) 

(c) 

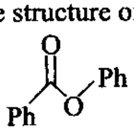
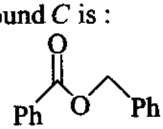
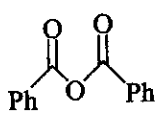
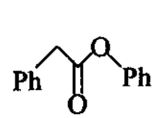
(d) 

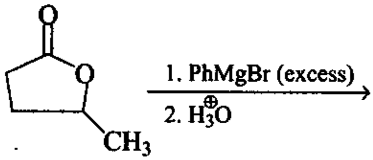
82. Consider the following sequence of reactions

 $\xrightarrow[\Delta]{P_4O_{10}} A \xrightarrow[H_3\overset{\oplus}{O}]{LiAlH_4} B$

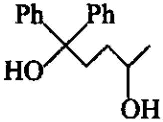
$$A + B \xrightarrow{\Delta} C + D\,(C_7H_6O_2)$$

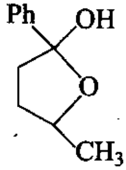
The structure of compound *C* is :

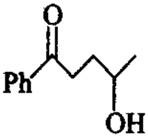
(a)  (b)  (c)  (d) 

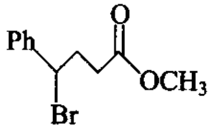
83. 

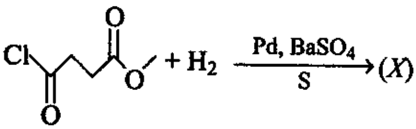
The major product formed in the reaction is :

(a) 

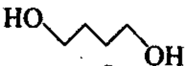
(b) 

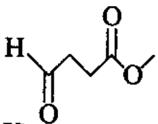
(c) 

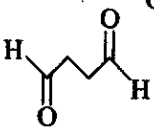
(d) 

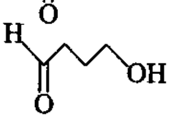
84. 

The structure of product (X) :

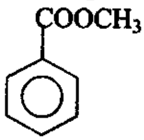
(a) 

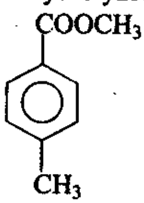
(b) 

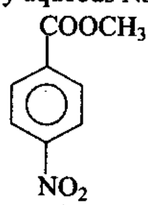
(c) 

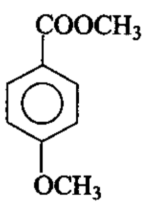
(d) 

85. The following esters are hydrolyzed by aqueous NaOH :

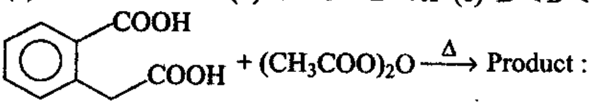

(A)

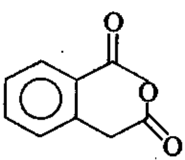

(B)

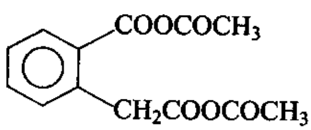

(C)

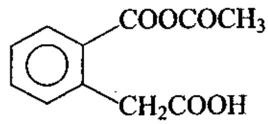

(D)

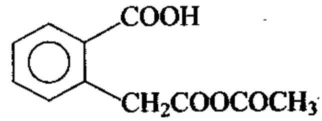
(a) $A < B < C < D$ (b) $C < B < D < A$ (c) $D < B < A < C$ (d) $C < D < A < B$

86. 

(a) 

(b) 

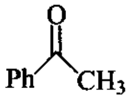
(c) 

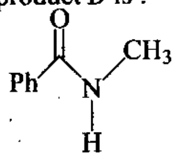
(d) 

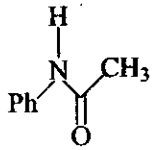
87. Consider the following sequence of reaction

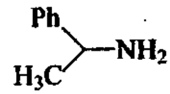
$$Ph{-}C{\equiv}CH \xrightarrow[H_2SO_4]{Hg^{+2}} A \xrightarrow[H_2SO_4]{NaN_3} B \text{ (Major)}$$

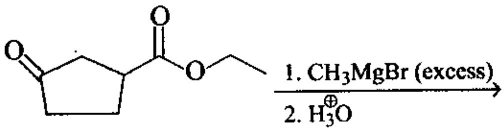
The structure of major product B is :

(a) 

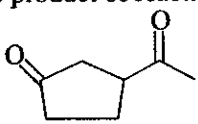
(b) 

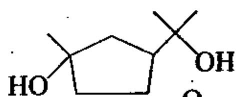
(c) 

(d) 

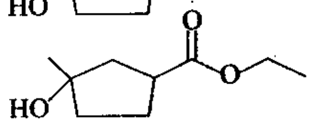
88. 

The product of reaction is :

(a) 

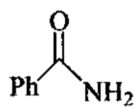
(b) 

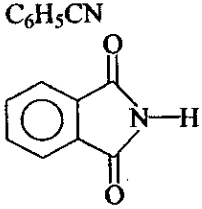
(c) 

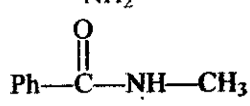
(d) 

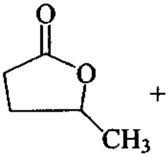
89. Which of the following compounds will not liberate ammonia gas on refluxing with aqueous NaOH?

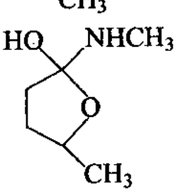
(a) C_6H_5CN

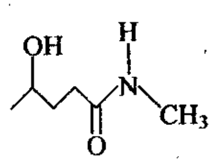
(b) 

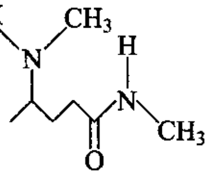
(c) 

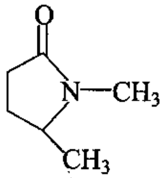
(d) 

90.  $+ CH_3NH_2 \longrightarrow (P)$; Product P is :

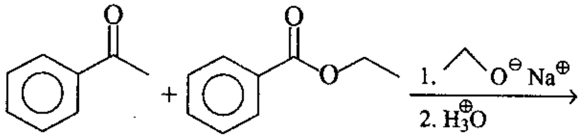
(a) 

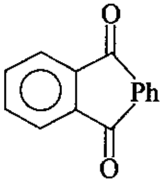
(b) 

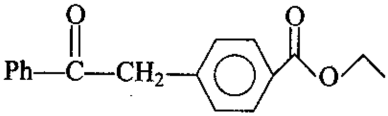
(c) 

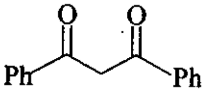
(d) 

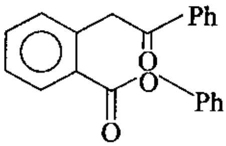
91. The major product of the reaction is :

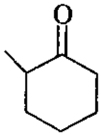


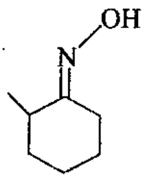
(a) 

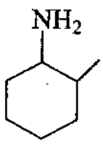
(b) 

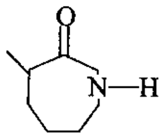
(c) 

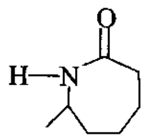
(d) 

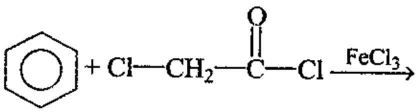
92.  $\xrightarrow[H_2SO_4]{N_3H}$ Major product :

(a) 

(b) 

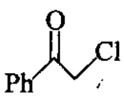
(c) 

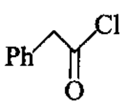
(d) 

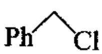
93. 

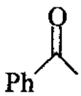
(1 Mole)

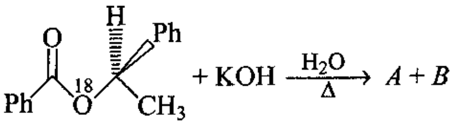
Major product formed is :

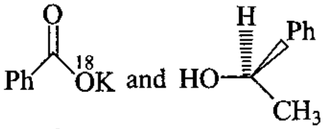
(a) 

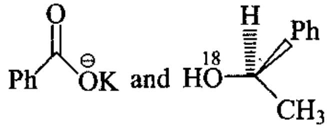
(b) 

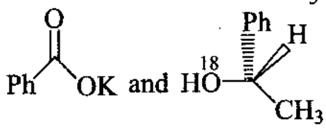
(c) 

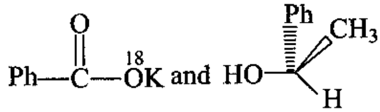
(d) 

94. 

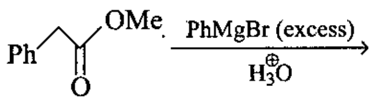
(a) 

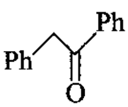
(b) 

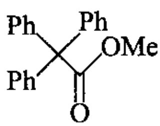
(c) 

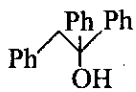
(d) 

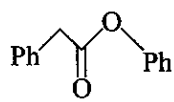
95. The major product formed in the reaction :



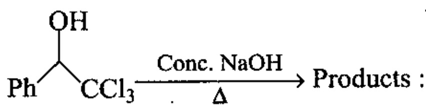
(a) 

(b) 

(c) 

(d) 

96. The products obtained in the reaction



(a) Ph—CHO and $CHCl_3$

(b) PhCHO and $HCOO^{\ominus}Na^{\oplus}$

(c) Ph—CH_2OH and $CHCl_3$

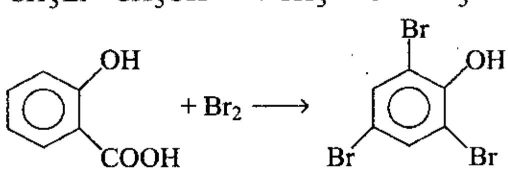
(d) $PhCOO^{\ominus}Na^{\oplus}$, $PhCH_2OH$ and $HCOO^{\ominus}Na^{\oplus}$

97. Identify the reaction among following which is not stated correctly :

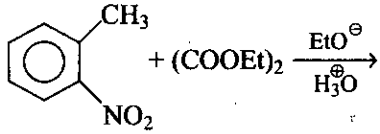
(a) $Ph—\overset{O}{\overset{\|}{C}}—O—C_2H_5 + NH_3 \longrightarrow Ph—\overset{O}{\overset{\|}{C}}—NH_2 + C_2H_5OH$

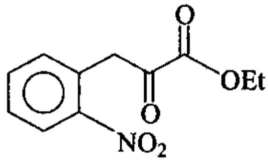
(b) $Ph—\overset{O}{\overset{\|}{C}}—NH_2 \xrightarrow[H_2O]{LiAlH_4} Ph—CH_2NH_2$

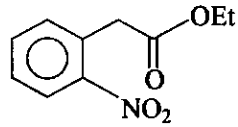
(c) $CH_3Li + CH_3OH \longrightarrow CH_3—O—CH_3 + LiOH$

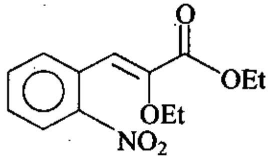
(d) 

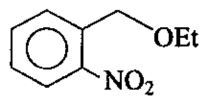
98. The major product formed in the reaction :



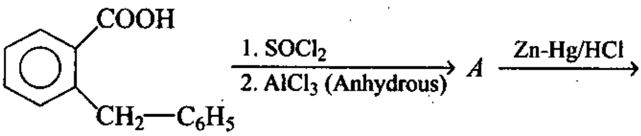
(a) 

(b) 

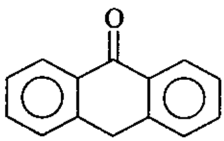
(c) 

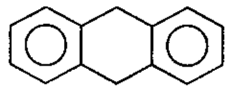
(d) 

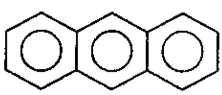
99. Consider the following sequence of reactions

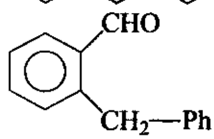


B ; Identify B :

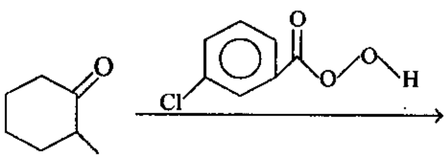
(a) 

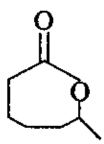
(b) 

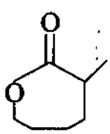
(c) 

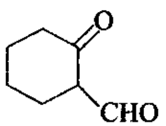
(d) 

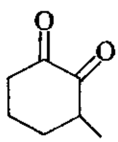
100. The major product of the reaction :



(a) 

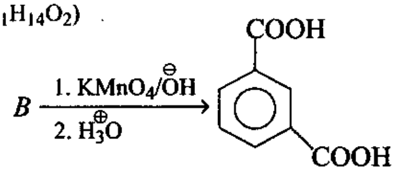
(b) 

(c) 

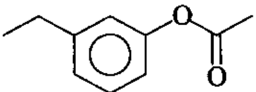
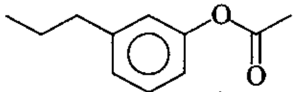
(d) 

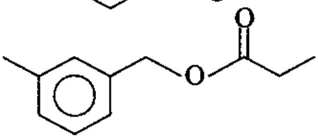
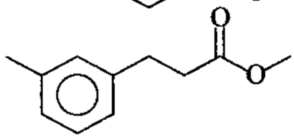
101. Consider the following sequence of reaction

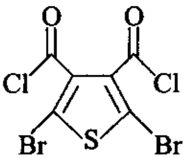
$$\underset{(C_{11}H_{14}O_2)}{A} \xrightarrow{\overset{\ominus}{O}H} B + CH_3CH_2COO^{\ominus}$$



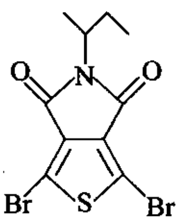
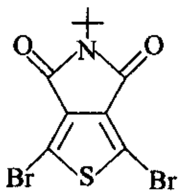
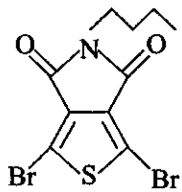
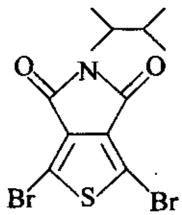
The compound A is :

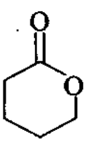
(a)  (b) 

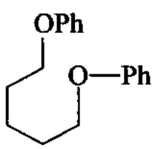
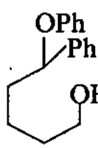
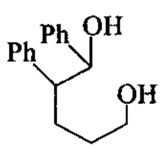
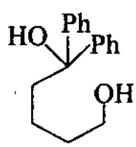
(c)  (d) 

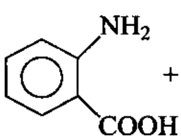
102.  $+ CH_3CH_2CH_2CH_2—NH_2 \xrightarrow{\Delta}$ 'X'

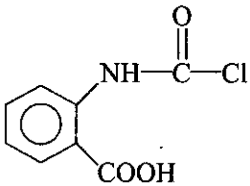
Identify structure of 'X' :

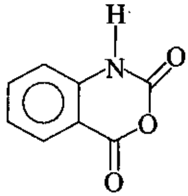
(a)  (b)  (c)  (d) 

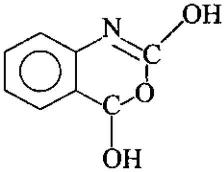
103.  $\xrightarrow[H_3\overset{\oplus}{O}]{\text{PhMgBr (excess)}}$ Product :

(a)  (b)  (c)  (d) 

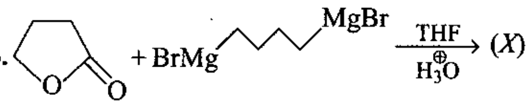
104.  $+ Cl—\overset{\overset{O}{\|}}{C}—Cl \longrightarrow P$; Product P will be :

(a) 

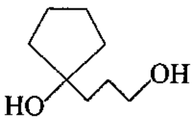
(b) 

(c) 

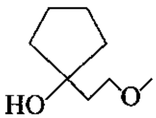
(d) none of these

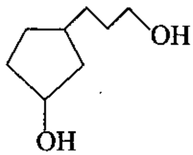
105. 

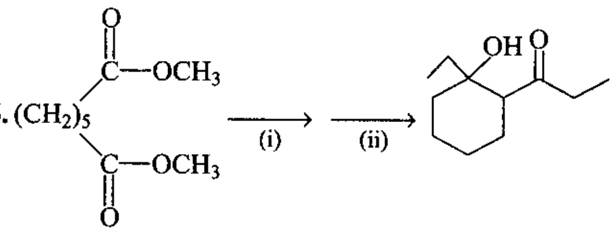
Identify (*X*) :

(a) 

(b) 

(c) 

(d) 

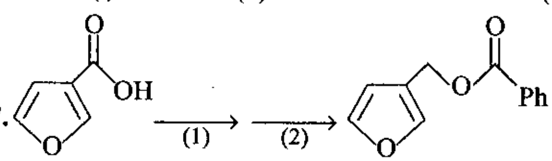
106. 

(a) $\xrightarrow[(i)]{H^{\oplus}} \xrightarrow[(ii)]{\text{EtMgBr (1 Mole)}}$

(b) $\xrightarrow[(i)]{\overset{\ominus}{O}H} \xrightarrow[(ii)]{2EtMgBr/H^{\oplus}, H_2O}$

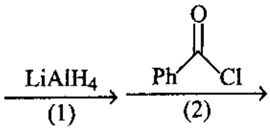
(c) $\xrightarrow[(i)]{{}^{\ominus}OH} \xrightarrow[(ii)]{\text{EtMgBr (1 Mole)}}$

(d) $\xrightarrow[(i)]{{}^{\ominus}OH} \xrightarrow[(ii)]{LiAlH_4}$

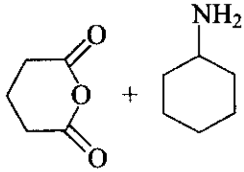
107. 

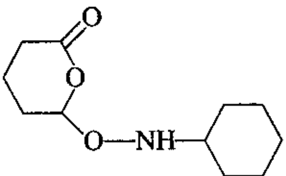
(a) $\xrightarrow[(1)]{\text{Na/liq } NH_3} \xrightarrow[(2)]{Ph\overset{O}{\overset{\|}{C}}Cl}$

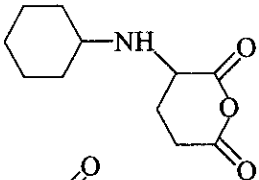
(b) $\xrightarrow[(1)]{LiAlH_4} \xrightarrow[(2)]{CH_3-\overset{O}{\overset{\|}{C}}-Cl}$

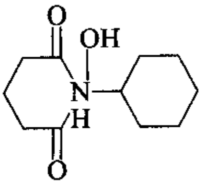
(c) 

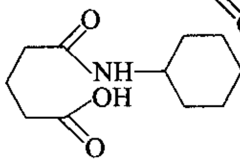
(d) $\xrightarrow[(1)]{\text{Zn-Hg/HCl}}$ $\xrightarrow[(2)]{CH_3-\overset{O}{\overset{\|}{C}}-Cl}$

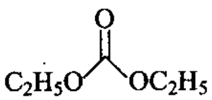
108.  $\longrightarrow$ (X) ; Identify structure of (X) :

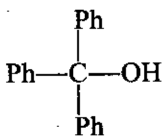
(a) 

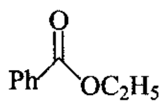
(b) 

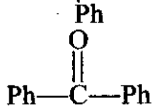
(c) 

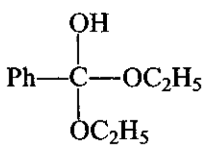
(d) 

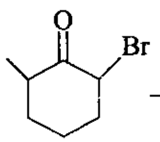
109.  + PhMgBr (excess) $\xrightarrow{H_3\overset{\oplus}{O}}$ Product :

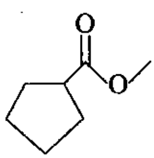
(a) 

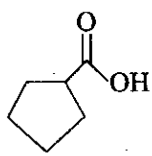
(b) 

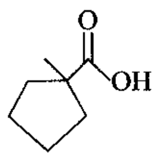
(c) 

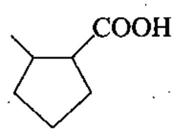
(d) 

110.  $\xrightarrow[2.\ H_3\overset{\oplus}{O}]{1.\ NaOH,\ H_2O}$ P ; Identify structure of product P :

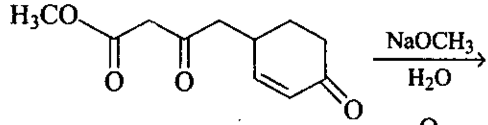
(a) 

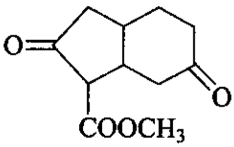
(b) 

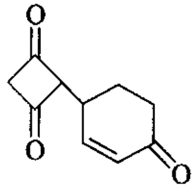
(c) 

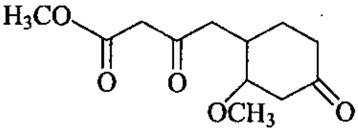
(d) 

111. Find out major product of following reaction :



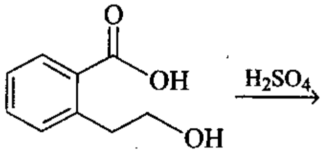
(a) 

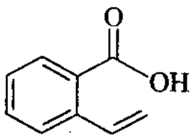
(b) 

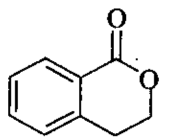
(c) 

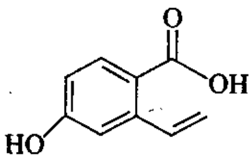
(d) No reaction

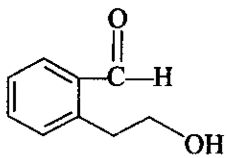
112. Identify the major product of following reaction :



(a) 

(b) 

(c) 

(d) 

113. Find out correct sequence of reagents for following conversion :

$$Ph{-}\overset{O}{\overset{\|}{C}}{-}OH \longrightarrow Ph{-}\overset{O}{\overset{\|}{C}}{-}H$$

(a) PCl_5, CH_3MgBr

(b) $CH_2N_2, NaBH_4$

(c) $SOCl_2, H_2/Pd, BaSO_4$

(d) $CH_3{-}\overset{O}{\overset{\|}{C}}{-}Cl, LiAlH_4$

114. $(CH_3)_3C{-}\overset{O}{\overset{\|}{C}}{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}O{-}C_2H_5 \xrightarrow[PhCH_2Br]{C_2H_5\overset{\ominus}{O}(1\ Mole)} \xrightarrow[\Delta]{H^{\oplus}/H_2O}$ Final product :

(a) $(CH_3)_3C{-}\overset{O}{\overset{\|}{C}}{-}CH_2{-}\overset{O}{\overset{\|}{C}}{-}OH$ (b) $(CH_3)_3C{-}\overset{O}{\overset{\|}{C}}{-}CH_3$

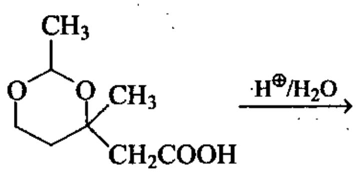
(c) $(CH_3)_3C{-}\overset{O}{\overset{\|}{C}}{-}\underset{CH_2Ph}{\underset{|}{CH}}{-}\overset{O}{\overset{\|}{C}}{-}OC_2H_5$ (d) $(CH_3)_3C{-}\overset{O}{\overset{\|}{C}}{-}CH_2{-}CH_2{-}Ph$

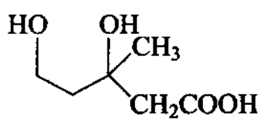
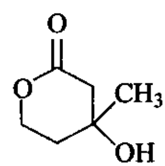
115. $Ph_2CH{-}\overset{O}{\overset{\|}{C}}{-}OH \xrightarrow[2.\ Et_3N,\ \Delta]{1.\ SOCl_2}$

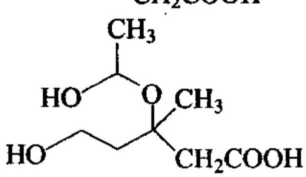
(a) $Ph_2C{=}C{=}O$ (b) $Ph_2C{=}C(Cl)(OH)$

(c) $Ph{-}\overset{O}{\overset{\|}{C}}{-}Ph$ (d) None of these

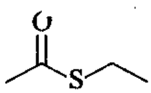
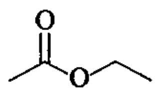
116. What would be the product of following reaction?

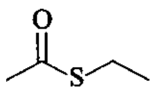
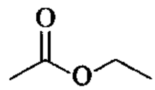


(a)  (b) 

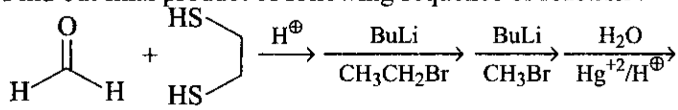
(c)  (d) None of these

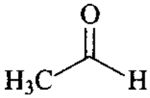
117. Which reaction occurs at the fastest rate?

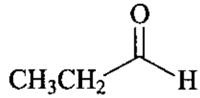
(a)  $+ CH_3{-}\ddot{N}H_2 \longrightarrow$ (b)  $+ CH_3{-}\ddot{N}H_2 \longrightarrow$

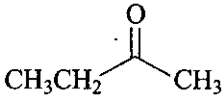
(c)  $+ H_2O \longrightarrow$ (d)  $+ H_2O \longrightarrow$

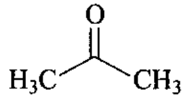
118. Find out final product of following sequence of reaction :



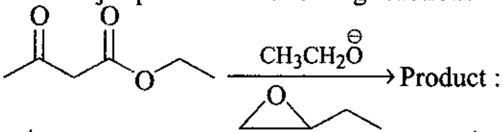
(a) 

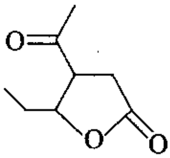
(b) 

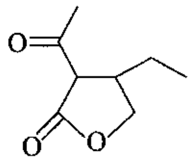
(c) 

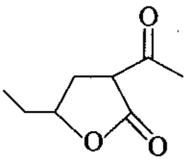
(d) 

119. Which is the major product of following reaction?

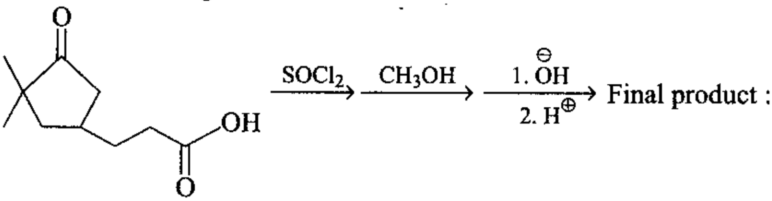


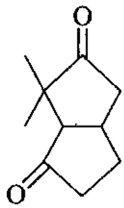
(a) 

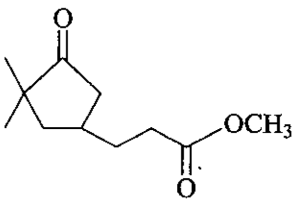
(b) 

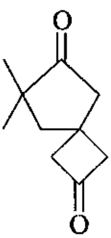
(c) 

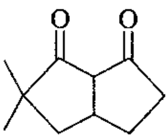
(d) None of these

120. 

(a) 

(b) 

(c) 

(d) 

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which of the following are correct methods for the preparation of propanoic acid?

(a) $H_3C-CH=CH_2 \xrightarrow{HBr} \xrightarrow[\text{Ether}]{Mg} \xrightarrow[H_3\overset{\oplus}{O}]{CO_2}$

(b) $H_3C-C\equiv CH \xrightarrow[H_2O_2, \overset{\ominus}{O}H]{BH_3\cdot THF} \xrightarrow{KMnO_4}$

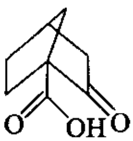
(c) $H_2C=CH_2 \xrightarrow{HBr} \xrightarrow[\text{Ether}]{Mg} \xrightarrow[H_3\overset{\oplus}{O}]{CO_2}$

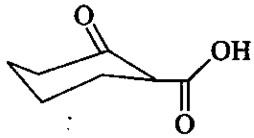
(d) $H_3C-CH=\underset{\underset{CH_3}{|}}{C}-CH_3 \xrightarrow[Ag_2O]{O_3}$

2. Which of the following carboxylic acids do not undergo decarboxylation simply on heating?

(a) $F_3C-\overset{\overset{O}{\|}}{C}-OH$

(b) $H_2C=CH-\overset{\overset{O}{\|}}{C}-OH$

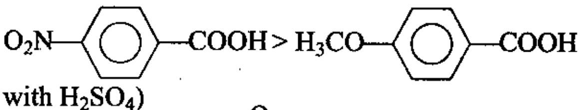
(c) 

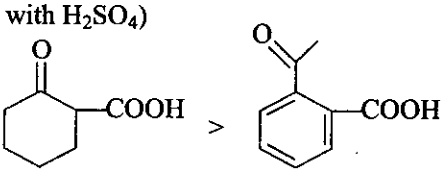
(d) 

3. Choose the incorrect rate of decarboxylation in the mentioned conditions :

(a) $H_3C-CH=CH-CH_2-\overset{\overset{O}{\|}}{C}-OH > H_3C-CH_2-CH=CH-\overset{\overset{O}{\|}}{C}-OH$
(decarboxylation on heating)

(b) $F_3C-COOH > Cl_3C-\overset{\overset{O}{\|}}{C}-OH$ (decarboxylation on heating with sodalime)

(c)  (decarboxylation on heating with H_2SO_4)

(d)  (decarboxylation on heating)

4. Which of the following ketoesters are not likely to have been prepared by Claisen condensation?

(a) $CH_3CH_2—\overset{\overset{O}{\|}}{C}—\underset{\underset{CH_3}{|}}{C}H—\overset{\overset{O}{\|}}{C}—OC_2H_5$

(b) $Ph—CH_2—\overset{\overset{O}{\|}}{C}—\underset{\underset{CH_3}{|}}{C}H—\overset{\overset{O}{\|}}{C}—OC_2H_5$

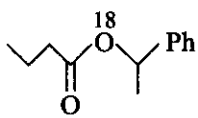
(c) $Ph—\overset{\overset{O}{\|}}{C}—CH_2—\overset{\overset{O}{\|}}{C}—OC_2H_5$

(d) $CH_3—CH_2—\overset{\overset{O}{\|}}{C}—O—CH_2—CH_2—\overset{\overset{O}{\|}}{C}—OC_2H_5$

5. Which of the following reagents cannot be used for the reduction of carboxylic acid to alcohol?
(a) $NaBH_4$
(b) H_2 and Pt catalyst
(c) $LiAlH_4$
(d) $NaBH_3CN$

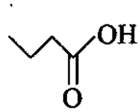
6. $R—CH_2—\overset{\overset{O}{\|}}{C}—OH \xrightarrow[H_2O]{P/Cl_2} R—\overset{\overset{Cl}{|}}{C}H—\overset{\overset{O}{\|}}{C}—OH$

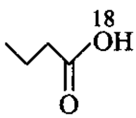
Which of the following are intermediate species responsible for product?
(a) $R—CH_2—\overset{\overset{O}{\|}}{C}—Cl$
(b) $R—\dot{C}H—\overset{\overset{O}{\|}}{C}—OH$
(c) $R—CH{=}\underset{\underset{Cl}{|}}{C}—OH$
(d) $R—\underset{\underset{Cl}{|}}{C}H—\overset{\overset{O}{\|}}{C}—Cl$

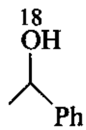
7. 

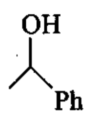
$\xrightarrow{H_2O,\ H^{\oplus}}$ Products

Products are :

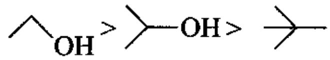
(a) 

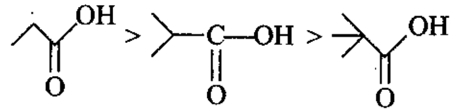
(b) 

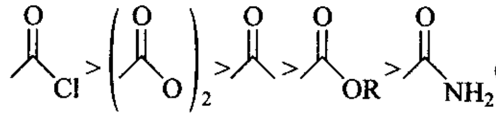
(c) 

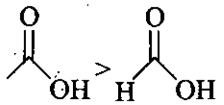
(d) 

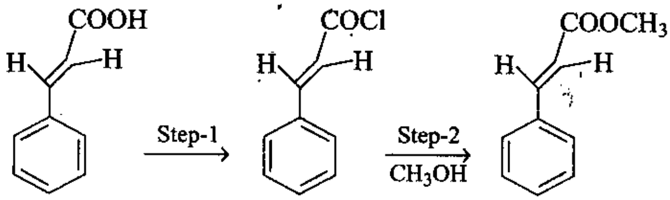
8. Find out correct orders :

(a)  (Rate of esterification)

(b)  (Rate of esterification)

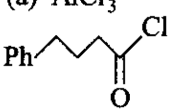
(c)  (Rate of nucleophilic addition)

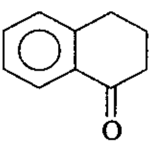
(d)  (Acidity)

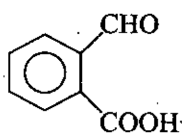
9. 

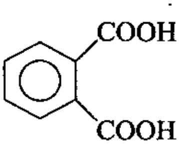
Which of the following reagents can be used in step-1?

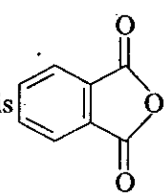
(a) $AlCl_3$ (b) HCl (c) PCl_5 (d) $SOCl_2$

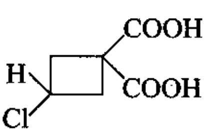
10.  $\xrightarrow{AlCl_3} X \xrightarrow[H^{\oplus}, \Delta]{Na_2Cr_2O_7} Y \xrightarrow{\Delta} Z$:

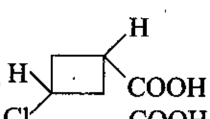
(a) X is 

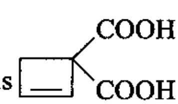
(b) Y is 

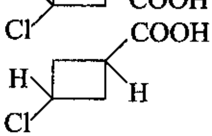
(c) Y is 

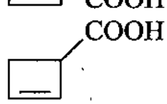
(d) Z is 

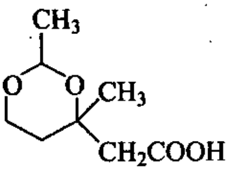
11.  $\xrightarrow{\Delta} X + Y$:

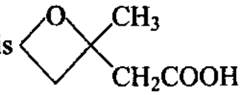
(a) X is 

(b) X is 

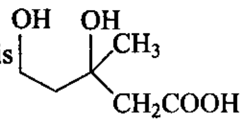
(c) Y is 

(d) Y is 

12.  $\xrightarrow{H^{\oplus}/H_2O} X + Y$:

(a) X is 

(b) X is 

(c) X is 

(d) Y is $CH_3—\overset{\overset{\displaystyle O}{\|}}{C}—H$

13. $Ph—CH_2—\underset{(+)}{\overset{\overset{\displaystyle CH_3}{|}}{C}H}—OH \xrightarrow{TsCl} X \xrightarrow{KSH} Y$:

(a) X is $Ph—CH_2—\underset{(+)}{\overset{\overset{\displaystyle CH_3}{|}}{C}H}—OTs$

(b) X is $Ph—CH_2—\underset{(-)}{\overset{\overset{\displaystyle CH_3}{|}}{C}H}—OTs$

(c) Y is $Ph—CH_2—\underset{(-)}{\overset{\overset{\displaystyle CH_3}{|}}{C}H}—SH$

(d) Y is $Ph—CH_2—\underset{(+)}{\overset{\overset{\displaystyle CH_3}{|}}{C}H}—SH$

14. $Ph—CH_2—O—\overset{\overset{\displaystyle O}{\|}}{C}—CH_3 + \overset{\ominus 18}{OH} \longrightarrow X + Y$:

(a) X is $Ph—CH_2—\overset{18}{O}H$

(b) X is $Ph—CH_2—OH$

(c) Y is $CH_3—\underset{\underset{\displaystyle O}{\|}}{C}—O^{\ominus}$

(d) Y is $CH_3—\underset{\underset{\displaystyle O}{\|}}{C}—\overset{18}{O}{}^{\ominus}$

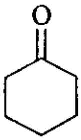
15. $R—COOH + (CF_3CO)_2O \longrightarrow X \xrightarrow{R'—OH} Y + Z$:

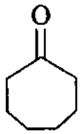
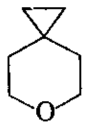
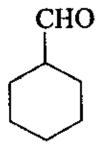
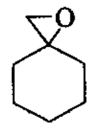
(a) Y is $R'—\underset{\underset{\displaystyle O}{\|}}{C}—O—R$

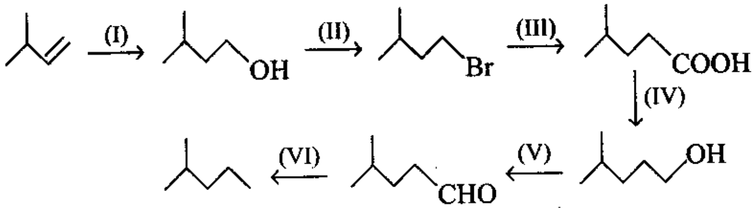
(b) X is $R—\underset{\underset{\displaystyle O}{\|}}{C}—O—\underset{\underset{\displaystyle O}{\|}}{C}—CF_3$

(c) Y is $R—\underset{\underset{\displaystyle O}{\|}}{C}—O—R'$

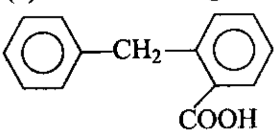
(d) Z is $CF_3—COOH$

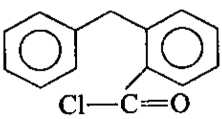
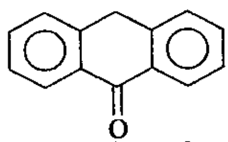
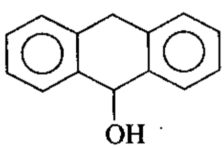
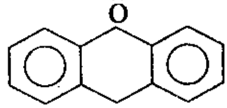
16.  $+ H_2CN_2 \longrightarrow X + Y$:

(a) X is  (b)  (c)  (d) 

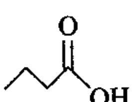
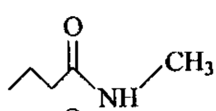
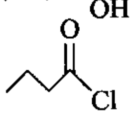
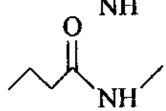
17. 

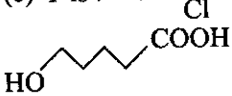
(a) I is B_2H_6, $H_2O_2/\overset{\ominus}{O}H$
(b) VI is Red P + HI
(c) V is Jones reagent
(d) II is $SOBr_2$

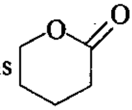
18.  $\xrightarrow{SOCl_2} X \xrightarrow{AlCl_3} Y \xrightarrow[HCl]{Zn—Hg} Z$:

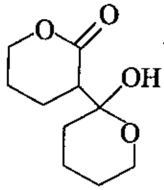
(a) X is 
(b) Y is 
(c) Z is 
(d) Z is 

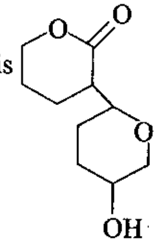
19.  $\xrightarrow[\substack{2.\ CO_2 \\ 3.\ H_3\overset{\oplus}{O}}]{1.\ Mg} X \xrightarrow{SOCl_2} Y \xrightarrow{CH_3NH_2} Z$:

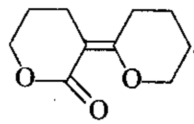
(a) X is 
(b) Y is 
(c) Y is 
(d) Z is 

20.  when treated with conc. H_2SO_4 and heated produces A. A when treated with base $\overset{\ominus}{O}H$ produces B and consequent heating produces C:

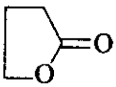
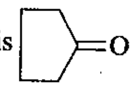
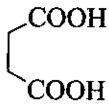
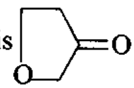
(a) A is 

(b) B is 

(c) B is 

(d) C is 

21. $\underset{(X)}{C_4H_8O_4} \xrightarrow{LiAlH_4} \xrightarrow{HBr} \xrightarrow{NaCN} \xrightarrow[\Delta]{H_3\overset{\oplus}{O},\ CaO} Y \xleftarrow{CaO,\ \Delta}$ hexanedioic acid :

(a) X is  (b) Y is  (c) X is  (d) Y is 

22. Which of the following can be used for the synthesis of benzyl acetate?

(a) $Ph—CH_2—OH + (CH_3CO)_2O \longrightarrow$

(b) $C_6H_5—CH_2OH + CH_3—\overset{\overset{\displaystyle O}{\|}}{C}—OH \xrightarrow{H^{\oplus}}$

(c) $C_6H_5CH_2OH + CH_3—\overset{\overset{\displaystyle O}{\|}}{C}—Cl \xrightarrow{Base}$

(d) $C_6H_5CH_2OH + CH_3COOH \xrightarrow{NaOH}$

23. In which of the following reactions is benzoic acid the major product?

(a) $C_6H_5CH_2OH \xrightarrow[2.\ H_3O^{\oplus}]{1.\ KMnO_4,\ \overset{\ominus}{O}H}$

(b) $C_6H_5—\overset{\overset{\displaystyle O}{\|}}{C}—CH_3 \xrightarrow[H_3^{\oplus}O]{Cl_2 + NaOH}$

(c) $C_6H_5MgBr \xrightarrow[H_3^{\oplus}O]{CO_2}$

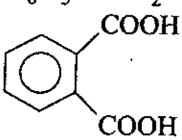
(d) $C_6H_5CH_3 \xrightarrow[H_3^{\oplus}O]{KMnO_4,\ \overset{\ominus}{O}H}$

24. Acid anhydride can be prepared by :

(a) $C_6H_5COOH + CH_3COCl \xrightarrow{Pyridine}$

(b) $C_6H_5COO^{\ominus}Na^{\oplus} + C_6H_5COCl \longrightarrow$

(c) $C_6H_5CONH_2 + CH_3COO^{\ominus}Na^{\oplus} \longrightarrow$

(d)  $\xrightarrow{\Delta}$

25. The oxidation of which of the following compounds with $KMnO_4, \overset{\ominus}{O}H/\Delta$ followed by treatment of acid will give benzoic acid?

(a) $C_6H_5CH_3$

(b) $C_6H_5CH{=}CH{-}CH_3$

(c) $C_6H_5C{\equiv}C{-}CH_3$

(d) $C_6H_5{-}\underset{}{\overset{\overset{\displaystyle O}{\|}}{C}}{-}CH_2OH$

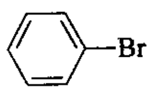
26. The intermediates formed during the reaction :

$$C_6H_5CH_2COOAg + Br_2 \xrightarrow[\Delta]{CCl_4} C_6H_5CH_2Br$$

(a) $C_6H_5{-}CH_2{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}O^{\bullet}$

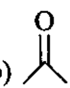
(b) $C_6H_5\dot{C}H_2$

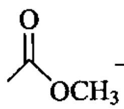
(c) $Br^{\bullet}$

(d) 

27. Which of the following reactions are used in the preparation of alcohols?

(a) $CH_3CH_2Br + aq. KOH \longrightarrow$

(b)  $\xrightarrow{LiAlH_4}$

(c)  $\xrightarrow{Na/EtOH}$

(d) $CH_3CH_2Cl \xrightarrow{H_2O}$

28. $R{-}\underset{\underset{\displaystyle N{-}OH}{\|}}{C}{-}R' \xrightarrow{PCl_5} R'{-}\overset{\overset{\displaystyle O}{\|}}{C}{-}NH{-}R$

Which of the following statements are correct for above reaction?

(a) Reaction is intermolecular

(b) Reaction is acid catalysed

(c) It is the *trans* hydrocarbon radical with respect to the —OH group that migrates.

(d) The rearrangement is intramolecular

29. Which of the following statements are correct for benzoic acid?

(a) Nitration gives *o*-and *p*-nitrobenzoic acid

(b) Bromination gives *m*-bromo benzoic acid

(c) The Friedel-Crafts reaction with $CH_3{-}\underset{\underset{\displaystyle O}{\|}}{C}{-}Cl/AlCl_3$ gives *m*-carboxy acetophenone.

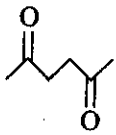
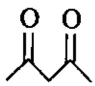
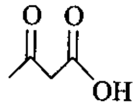
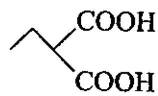
(d) The reaction with oleum gives 3-sulphobenzoic acid

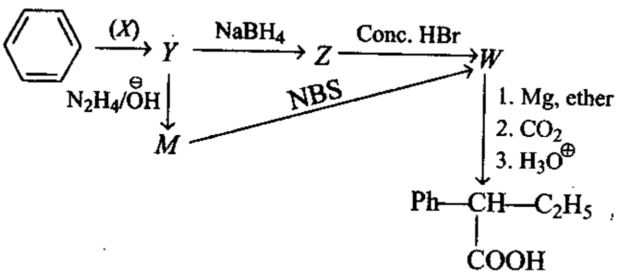
30. In which of the following esters the α-hydrogen is acidic?

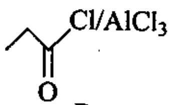
(a) $H-\overset{\overset{\displaystyle O}{\|}}{C}-OC_2H_5$ (b) $O_2N-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OC_2H_5$

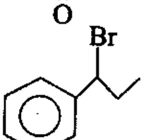
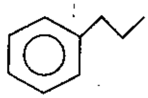
(c) $\underset{\underset{\displaystyle CN}{|}}{CH_2}-\overset{\overset{\displaystyle O}{\|}}{C}-OEt$ (d) $Ph-CH_2-\overset{\overset{\displaystyle O}{\|}}{C}-OEt$

31. Which of the following would be decarboxylates readily when heated?

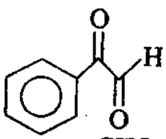
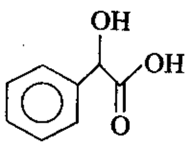
(a)  (b)  (c)  (d) 

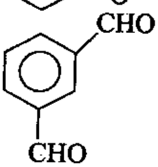
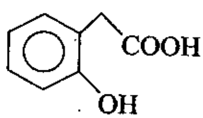
32. 

(a) (*X*) is  (b) (*Y*) is $Ph-\overset{\overset{\displaystyle OH}{|}}{CH}-CH_3$

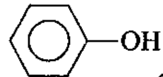
(c) *W* is  (d) *M* is 

33. Compound (*A*) $C_8H_6O_2$ on treatment with aq. NaOH followed by acidification gives (*B*) $C_8H_8O_3$ which on oxidation gives benzoic acid only :

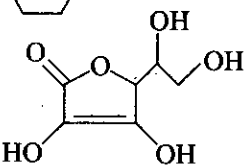
(a) *A* is  (b) *B* is 

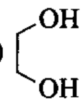
(c) *A* is  (d) *B* is 

34. Which of the following will liberate CO_2 on reaction with $NaHCO_3$?

(a) 

(b) CH_3COOH

(c) 

(d) 

35. In Hofmann bromamide degradation reaction

$$R-\overset{\overset{\large O}{\|}}{C}-NH_2 + KOH + Br_2 \longrightarrow$$

intermediates are :

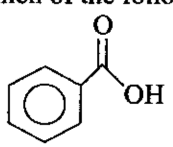
(a) RCONHBr (b) RNCO (c) RNH_2 (d) none of these

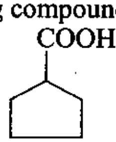
36. $\underset{(X)}{C_4H_{11}N} + HNO_2 \longrightarrow C_4H_{10}O$ (3° alcohol)

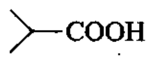
(X) will give :

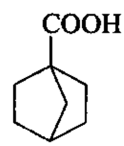
(a) carbylamine reaction
(b) Hofmann mustard oil reaction
(c) diazonium salt with HNO_2
(d) base insoluble product with Hinsberg reagents

37. Which of the following compounds will give HVZ reaction?

(a) 

(b) 

(c) 

(d) 

38. In the given reaction

$$R-\overset{\overset{\large O}{\|}}{C}-OH \xrightarrow{(X)} R-\overset{\overset{\large O}{\|}}{C}-O-CH_3$$

(X) will be :

(a) CH_2N_2 (b) $CH_3OH/H^{\oplus}$ (c) MeCOOH (d) Me_2SO_4

39. $$P \xrightarrow[H^{\oplus}/H_2O]{PhMgBr} CH_3-\underset{\underset{\large Ph}{|}}{\overset{\overset{\large OH}{|}}{C}}-Ph$$

Identify structures of P :

(a) $CH_3-\overset{\overset{\large O}{\|}}{C}-Cl$

(b) $CH_3-\overset{\overset{\large O}{\|}}{C}-OC_2H_5$

(c) $CH_3-\overset{\overset{\large O}{\|}}{C}-Ph$

(d) CH_3OH

40. An ester A of the formula $C_5H_8O_2$ on acidic, hydrolysis gives an acid B, which reduces Tollen's reagent and an alcohol C, which gives iodoform test. Ester A can also be converted into alcohol B by reaction with excess of Grignard reagent D.

(a) A is $H-\overset{\overset{O}{\|}}{C}-O-CH(CH_3)_2$

(b) B is $H-\overset{\overset{O}{\|}}{C}-OH$

(c) C is $HO-CH(CH_3)_2$

(d) D is C_2H_5MgBr

41. $H_3C-\overset{\overset{O}{\|}}{C}-O-\underset{\underset{Ph}{|}}{C}=CH_2 + H_2O \xrightarrow[H_3^{\oplus}O]{NaOH} X + Y$

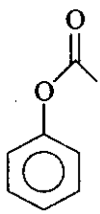
X and Y are :

(a) X is $CH_3-\overset{\overset{O}{\|}}{C}-O-CH_2-Ph$

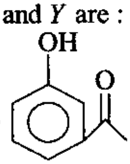
(b) Y is HCHO

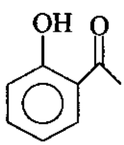
(c) Y is $H_3C-\overset{\overset{O}{\|}}{C}-OH$

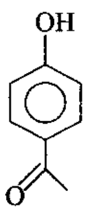
(d) X is $Ph-\underset{\underset{O}{\|}}{C}-CH_3$

42.  $\xrightarrow[\Delta]{AlCl_3} X + Y$

X and Y are :

(a) 

(b) 

(c) 

(d) all of these

43. $Ph-\overset{\overset{O}{\|}}{C}-Ph \xrightarrow{PhCO_3H} A \xrightarrow{LiAlH_4} B + C$

B and C are respectively :

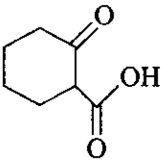
(a) $Ph-CH_2-OH$

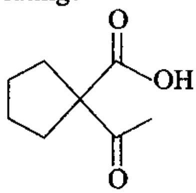
(b) $Ph-\overset{\overset{O}{\|}}{C}-O-Ph$

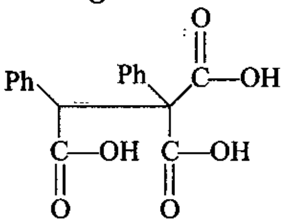
(c) Ph—OH

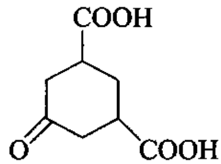
(d) $Ph-\overset{\overset{\large O}{\|}}{C}-CH_2-Ph$

44. Which of the following decarboxylate on heating?

(a) 

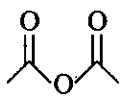
(b) 

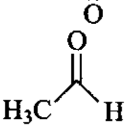
(c) 

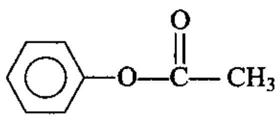
(d) 

45. Which of the following will form $Ph-NH-\underset{\underset{\large O}{\|}}{C}-CH_3$ on reaction with aniline?

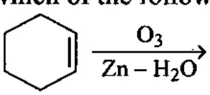
(a) $CH_3-\underset{\underset{\large O}{\|}}{C}-Cl$

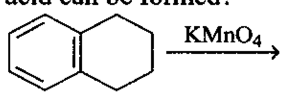
(b) 

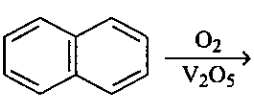
(c) 

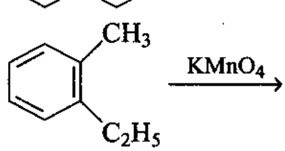
(d) 

46. In which of the following reaction phthalic acid can be formed?

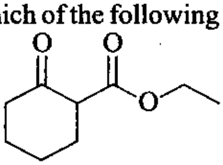
(a) 

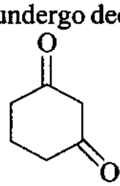
(b) 

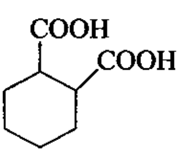
(c) 

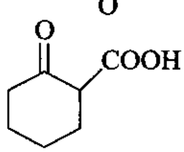
(d) 

47. Which of the following compounds cannot undergo decarboxylation on heating?

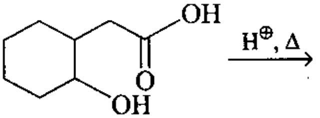
(a) 

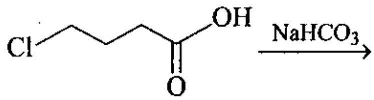
(b) 

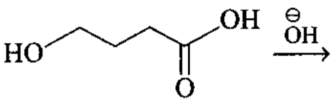
(c) 

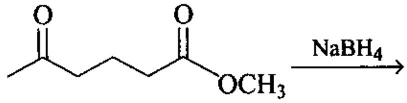
(d) 

48. Which of the following reactions can be used to prepare lactones (cyclic esters)?

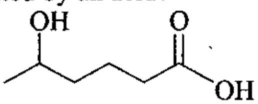
(a) 

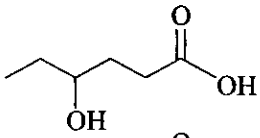
(b) 

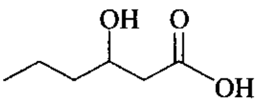
(c) 

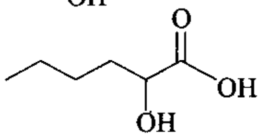
(d) 

49. Which of the following will give cyclic products upon being heated or being treated by an acid?

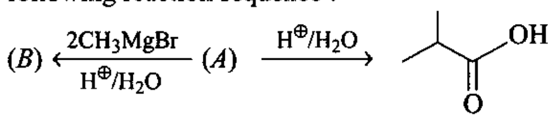
(a) 

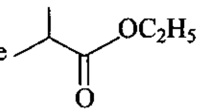
(b) 

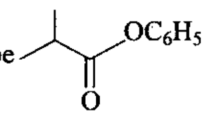
(c) 

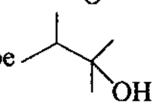
(d) 

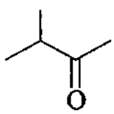
50. Consider the following reaction sequence :



(a) Compound A can be 

(b) Compound A can be 

(c) Compound B can be 

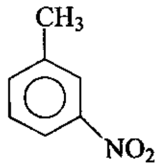
(d) Compound B can be 

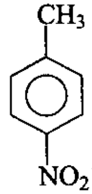
EXERCISE-3 LINKED COMPREHENSION TYPE

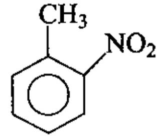
Passage-1

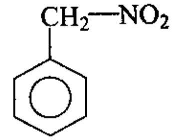
Compound A having molecular formula $C_7H_7NO_2$ can undergo reduction with Sn + HCl. Treatment of A with $KMnO_4$ gives a compound B ($C_7H_5NO_4$) which has lower boiling point compared to its other isomer. B when treated with $SOCl_2$ produces C. C when treated with CH_2N_2 produces D of molecular formula $C_8H_5N_3O_3$. D when treated with Ag/H_2O produces E.

1. Find out structure of A :

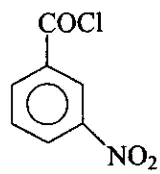
(a) 

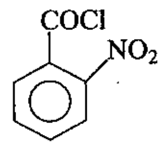
(b) 

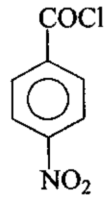
(c) 

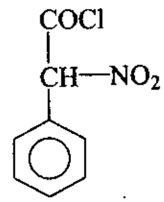
(d) 

2. Find out structure of C :

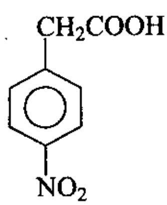
(a) 

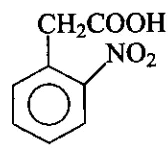
(b) 

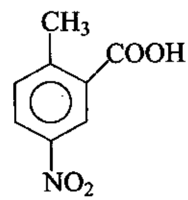
(c) 

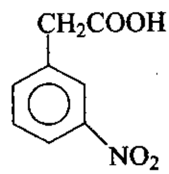
(d) 

3. Find out structure of E :

(a) 

(b) 

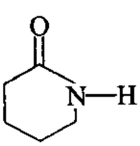
(c) 

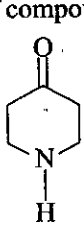
(d) 

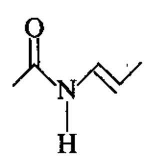
Passage-2

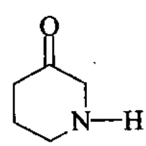
An organic compound A on acid hydrolysis produces B, an amino acid. B on treatment with HNO_2 gives C. C on heating with conc. H_2SO_4 produces a lactone D. A can also be synthesised by the reaction of cyclopentanone with $H_2N—OH$ followed by treatment of conc. H_2SO_4.

4. What is the structure of compound A?

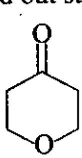
(a) 

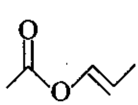
(b) 

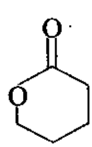
(c) 

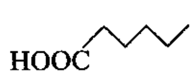
(d) 

5. Find out structure of D :

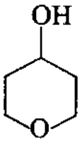
(a) 

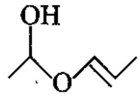
(b) 

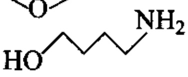
(c) 

(d) 

6. $D \xrightarrow[H_2O]{LiAlH_4}$ Product :

(a) 

(b) 

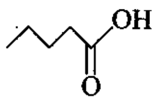
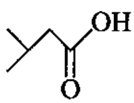
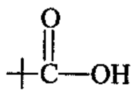
(c) 

(d) 

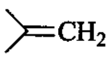
Passage-3

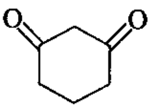
An organic compound $(A)C_5H_{10}O_2$ reacts with Br_2 in presence of phosphorus to give (B). Compound (B) contains an asymmetric carbon atom and yields (C) on dehydrobromination. Compound (C) does not show geometrical isomerism and on decarboxylation gives an alkene (D) which on ozonolysis gives E and F. Compound (E) gives positive Schiff test but (F) does not.

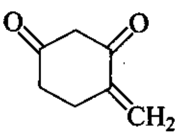
7. Identify correct structure of A :

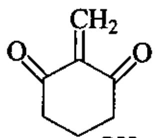
(a) 
(b) 
(c) 
(d) None of these

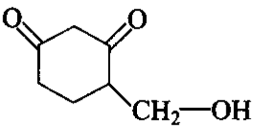
8. Find out structure of D :

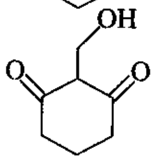
(a) 
(b) 
(c) 
(d) 

9. E +  $\xrightarrow[\Delta]{NaOH}$

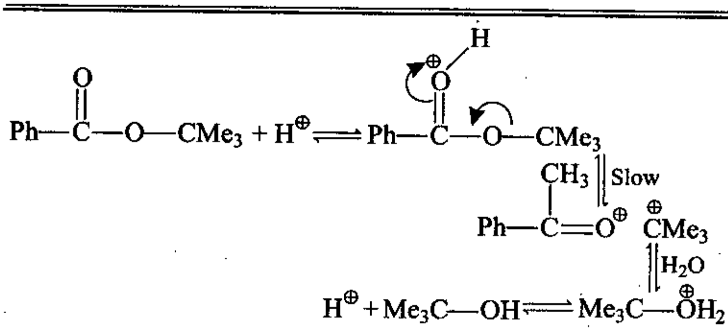
(a) 

(b) 

(c) 

(d) 

Passage-4



10. Choose the correct case of hydrolysis for the following molecules :

$$\underset{(P)}{CH_3-\overset{\overset{O}{\|}}{C}-OCPh_3},\quad \underset{(Q)}{CH_3-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-O-CPh_3},\quad \underset{(R)}{Ph-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-O-CPh_3}$$

$$\underset{(S)}{CH_3CH_2-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-O-CPh_3}$$

(a) $P>Q>R>S$ (b) $P=Q=R=S$ (c) $S>R>Q>P$ (d) $Q>P>S>R$

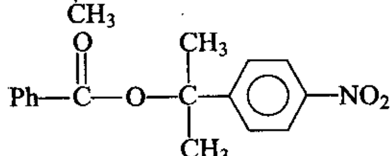
11. $CH_3-\overset{\overset{O}{\|}}{C}-OCMe_3 \xrightarrow[H_2SO_4]{H_2\overset{18}{O}}$ Products :

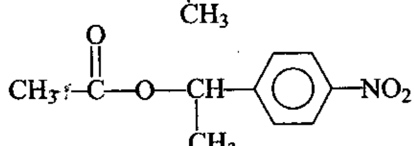
(a) $CH_3-\overset{\overset{\overset{18}{O}}{\|}}{C}-OH + Me_3C-OH$ (b) $CH_3-\overset{\overset{O}{\|}}{C}-OH + Me_3C-\overset{18}{O}H$

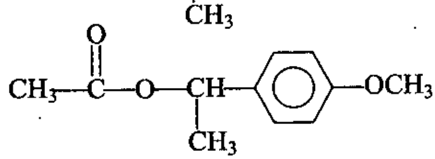
(c) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{18}{O}H + Me_3C-OH$ (d) $CH_3-\overset{\overset{O}{\|}}{C}-OH + Me_3C-OH$

12. Which of the following will give the racemised product on hydrolysis in presence of H_2SO_4?

(a) $Ph-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-O-CH_2CH_3$

(b) 

(c) 

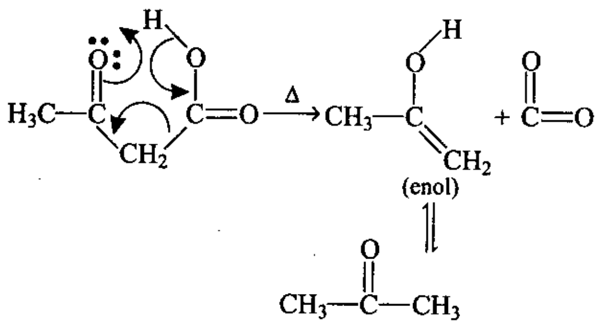
(d) 

Passage-5

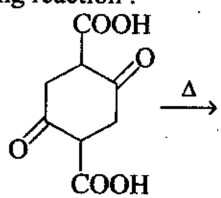
The decarboxylation of β-ketoacids, β, γ-unsaturated acid and geminal diacid proceed through the formation of cyclic transition state in presence of heat.

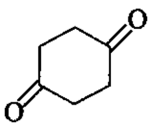
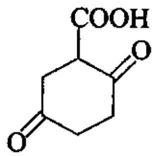
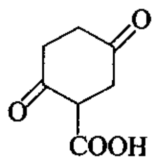
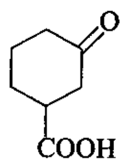
$$CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-CH_2-\overset{\displaystyle O}{\overset{\|}{C}}-OH \xrightarrow{\Delta} CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-CH_3$$

Mechanism :



13. Find the product of following reaction :



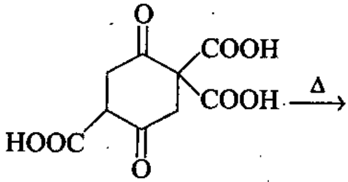
(a)  (b)  (c)  (d) 

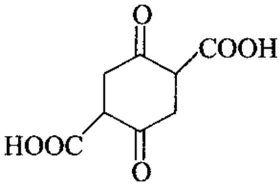
14. Find the correct product of following reaction :

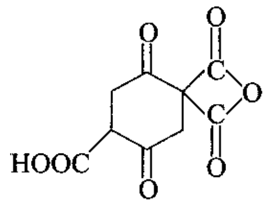
$$H_3C-CH=CH-CD_2-\overset{\displaystyle O}{\overset{\|}{C}}-OH \xrightarrow{\Delta}$$

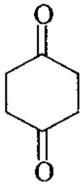
(a) $H_3C-CH_2-CH=CD_2$ (b) $CH_3-CH=CH-CHD_2$

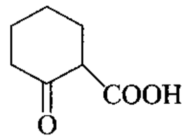
(c) $H_3C-\underset{\displaystyle CHD_2}{\underset{|}{C}}=CH_2$ (d) None of these

15. 

(a) 

(b) 

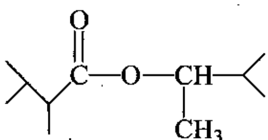
(c) 

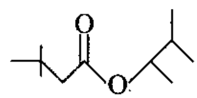
(d) 

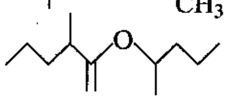
Passage-6

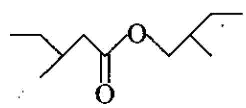
An optically active ester 'F' have molecular weight 186. Hydrolysis of 'F' gives two optically active compounds 'G' and 'H'. 'G' which is soluble in NaOH and 'H'. 'H' gives a positive iodoform test and on warming with conc. H_2SO_4 gives 'I' with no diastereomers. When Ag salt of 'G' reacted with Br_2, racemic mixture 'J' is formed. Optically active 'J' is formed when 'H' is treated with TsCl and then with NaBr.

16. Find out structure of F :

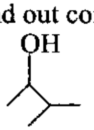
(a) 

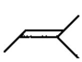
(b) 

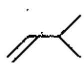
(c) 

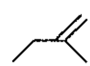
(d) 

17. Find out correct structure of I :

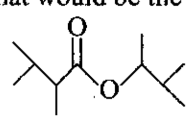
(a) 

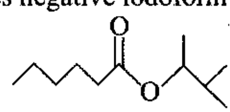
(b) 

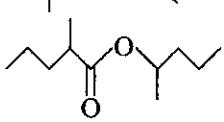
(c) 

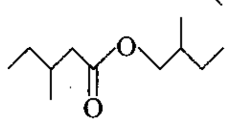
(d) 

18. What would be the structure of F if H gives negative iodoform test?

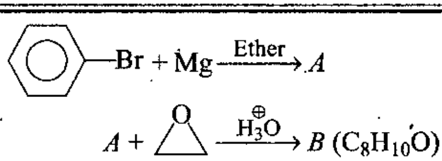
(a) 

(b) 

(c) 

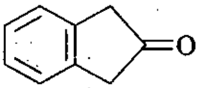
(d) 

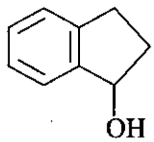
Passage-7

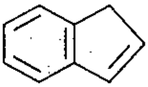


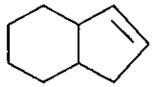
$$B + PBr_3 \longrightarrow C$$
$$C + NaCN \longrightarrow D$$
$$D + H_2SO_4 \xrightarrow{\Delta} E\,(C_9H_{10}O_2)$$
$$E + SOCl_2 \longrightarrow F$$
$$F + AlCl_3 \longrightarrow G$$
$$G \xrightarrow{LiAlH_4} H \xrightarrow[\Delta]{H_2SO_4} I$$

19. Find out structure of I :

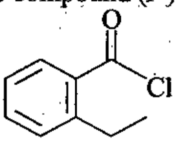
(a) 

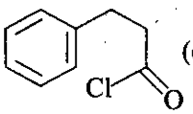
(b) 

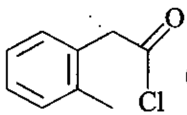
(c) 

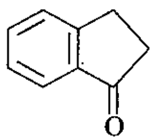
(d) 

20. The compound (F) must be :

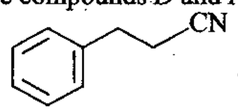
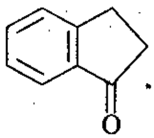
(a) 

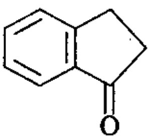
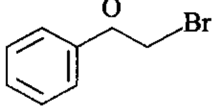
(b) 

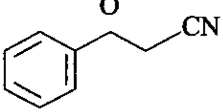
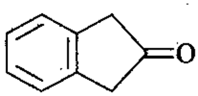
(c) 

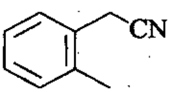
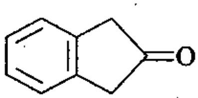
(d) 

21. The compounds D and F must be :

(a)  and 

(b)  and 

(c)  and 

(d)  and 

Passage-8

The Hunsdiecker reaction is believed to proceed by a free radical mechanism and involves the formation of an acyl hypohalite.

A. $$R\!-\!\overset{\overset{\displaystyle O}{\|}}{C}\!-\!O\!-\!Ag + Br_2 \longrightarrow R\!-\!\overset{\overset{\displaystyle O}{\|}}{C}\!-\!O\!-\!Br + AgBr$$

B. $R-\overset{\overset{O}{\|}}{C}-O-Br \longrightarrow R-\overset{\overset{O}{\|}}{C}-\dot{O}+\dot{Br}$

C. $R-\overset{\overset{O}{\|}}{C}-\dot{O} \longrightarrow R^{\bullet}+CO_2$

D. $R\bullet+R-\overset{\overset{O}{\|}}{C}-OBr \longrightarrow R-Br+R-\overset{\overset{O}{\|}}{C}-O^{\bullet}$

22. $Ph-CH=CH-\underset{\underset{CH_3}{|}}{CH}-\overset{\overset{O}{\|}}{C}-OAg \xrightarrow[\Delta]{Br_2} \text{Product}$

The major product is :

(a) $Ph-CH=CH-\underset{\underset{CH_3}{|}}{CH}-Br$

(b) $Ph-\overset{\overset{Br}{|}}{CH}-CH=CH-CH_3$

(c) $Ph-CH=\overset{\overset{Br}{|}}{C}-CH_2-CH_3$

(d) $Ph-CH=CH-\underset{\underset{CH_3}{|}}{CH}-CH_2Br$

23. $H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-\overset{\overset{O}{\|}}{C}-OAg \xrightarrow[\Delta]{Br_2}$ Major product :

(a) $H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-Br$

(b) $H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-Br$

(c) $H_2C=C\begin{matrix}\diagup CH_3\\ \diagdown CH_3\end{matrix}$

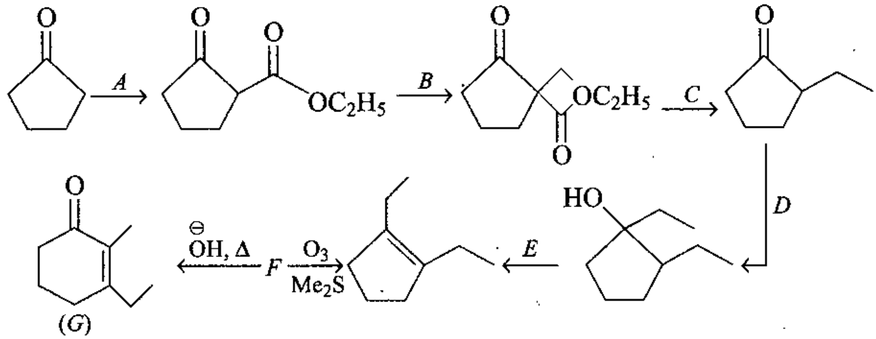
(d) $H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_3$

24. The rate determining step is :

(a) Step I (b) Step II

(c) Step III (d) Step IV

Passage 9



25. Find out correct combination of '*A*' :

(a) $C_2H_5\overset{\ominus}{O}, Cl-\overset{\overset{O}{\|}}{C}-OC_2H_5$ (b) $C_2H_5\overset{\ominus}{O}, CH_3-\overset{\overset{O}{\|}}{C}-Cl$

(c) $C_2H_5\overset{\ominus}{O}, CH_3-\overset{\overset{O}{\|}}{C}-OC_2H_5$ (d) $H^{\oplus}/H_2O, CH_3-\overset{\overset{O}{\|}}{C}-OC_2H_5$

26. Identify '*C*' :

(a) $C_2H_5\overset{\ominus}{O}, CH_3CH_2-I$ (b) $H^{\oplus}/H_2O, \Delta$

(c) MgBr, $H^{\oplus}/H_2O$ (d) None of these

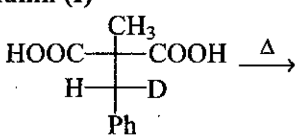
27. Name of the reaction which converts *F* into *G* :

(a) Cannizzaro reaction (b) Claisen condensation

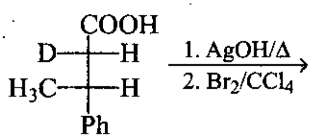
(c) Aldol condensation (d) Reformatsky reaction

EXERCISE-4 MATRIX MATCH TYPE

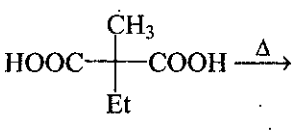
1. Column (I) **Column (II)**

(a) 

P. Diastereomers

(b) 

Q. Racemic mixture

(c) 

R. Optically active

(d) $Ph—C(=O)—CD(CH_3)—C(=O)—OH \xrightarrow{\Delta}$ *S*. CO_2 will evolve

2. Column (I)   **Column (II)**

(a) $Ph—CH(OH)—COOH \xrightarrow{\Delta}$ *P*. Cyclic

(b) $Ph—CH(OH)—CH_2—COOH \xrightarrow{\Delta}$ *Q*. Exhibit geometrical isomerism

(c) $Ph—CH(OH)—CH_2—CH_2—COOH \xrightarrow{\Delta}$ *R*. Can be optically active

(d) $HO—CH_2—COOH \xrightarrow{\Delta}$ *S*. Lactone

3. Column (I)   **Column (II)**

(a) $H_3C—C(=O)—O—CH_2CH_3 \xrightarrow{H^{\oplus}/H_2O}$ *P*. Bimolecular

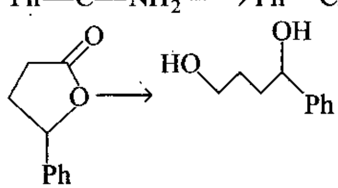
(b) $H_3C—C(=O)—O—CPh_3 \xrightarrow{H^{\oplus}/H_2O}$ *Q*. Unimolecular

(c) $Ph—C(Ph)_2—C(=O)—O—CH_3 \xrightarrow{H^{\oplus}/H_2O}$ *R*. Alkyl cleavage

(d) $CH_3CH_2—C(=O)—O—CH_3 \xrightarrow{\overset{\ominus}{O}H/H_2O}$ *S*. Acyl cleavage

4. Column (I)   **Column (II)**

(a) $Ph—C(=O)—NH_2 \longrightarrow Ph—CH_2OH$ *P*. B_2H_6, AcOH, H_2O

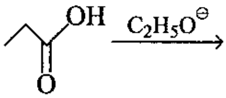
(b) 

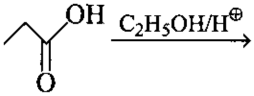
  Q. $LiAlH_4$

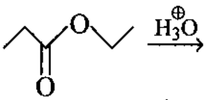
(c) $Ph—CH=CH—COOH$ *R*. H_2, Pd-$BaSO_4$

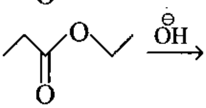
(d) $CH_3-\overset{\overset{\large O}{||}}{C}-Cl$ *S*. None of these

5. **Column (I)**   **Column (II)**

(a)    *P*. Hydrolysis

(b)    *Q*. Esterification

(c)    *R*. Saponification

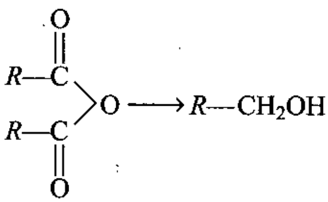
(d)    *S*. Acid Base reaction

6. **Column (I)**   **Column (II)**

(a) $-\overset{\overset{\large O}{||}}{C}-OH \longrightarrow -CH_2OH$ *P*. $LiAlH_4$

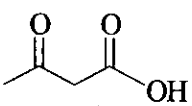
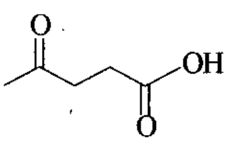
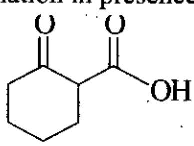
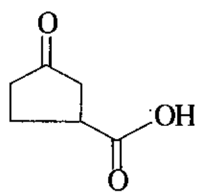
(b) $-\overset{\overset{\large O}{||}}{C}-Cl \longrightarrow -CH_2OH$ *Q*. $NaBH_4$

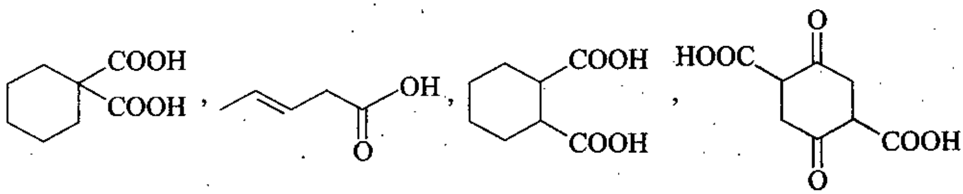
(c) $-\overset{\overset{\large O}{||}}{C}-OR' \longrightarrow -CH_2OH$ *R*. B_2H_6/THF

(d)    *S*. H_2/Pd

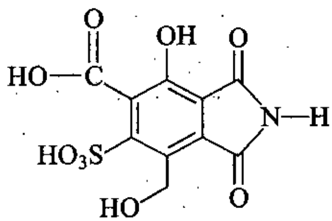
EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

1. Examine the structure of following compounds, and find out number of compounds that will undergo decarboxylation in presence of heat.

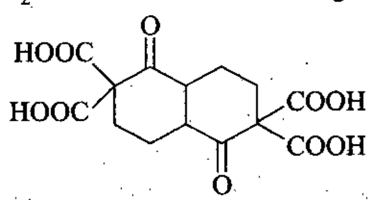
 ,  ,  , 



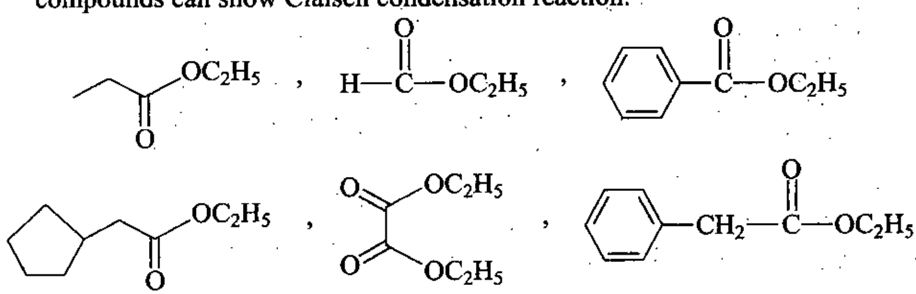
2. How many moles of NaOH would be required for complete neutralization of following compounds.

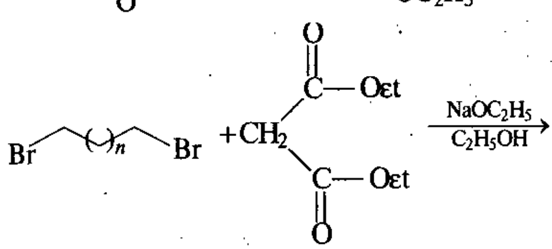


3. How many moles of CO_2 will released when following compound treated with heat.

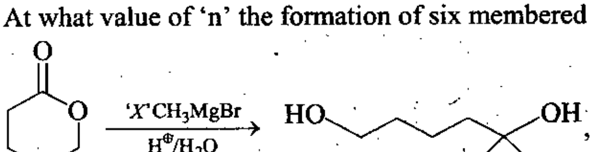


4. Examine the structural formulas of following compounds and find out how many compounds can show Claisen condensation reaction.



5.  Cyclic product,

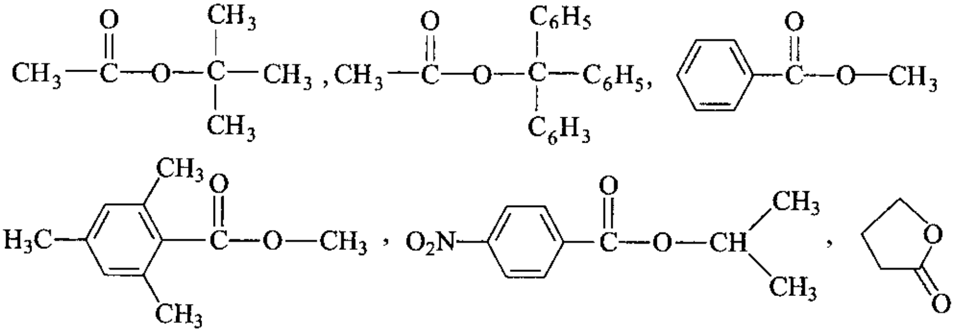
At what value of 'n' the formation of six membered ring take place.

6. , Find out value of '*X*'.

7. $CH_3-\overset{O}{\overset{\|}{C}}-OC_2H_5 + CH_3CH_2-\overset{O}{\overset{\|}{C}}-OC_2H_5 \xrightarrow[C_2H_5OH]{C_2H_5\overset{\ominus}{O}\overset{\oplus}{Na}}$

How many different condensation products would be form by above reaction.

8. How many of following esters show $A_{AL^{-1}}$ hydrolysis (Acid catalyzed, unimolecular and alkyl-oxygen fission ester hydrolysis)



ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (c)	2. (c)	3. (b)	4. (c)	5. (c)	6. (d)	7. (b)	8. (d)	9. (d)	10. (a)
11. (d)	12. (b)	13. (d)	14. (a)	15. (c)	16. (d)	17. (a)	18. (b)	19. (c)	20. (c)
21. (b)	22. (c)	23. (c)	24. (b)	25. (a)	26. (c)	27. (d)	28. (a)	29. (c)	30. (a)
31. (d)	32. (a)	33. (b)	34. (b)	35. (c)	36. (c)	37. (d)	38. (c)	39. (a)	40. (b)
41. (c)	42. (b)	43. (c)	44. (b)	45. (d)	46. (b)	47. (a)	48. (d)	49. (c)	50. (b)

Level-2

1. (c)	2. (b)	3. (a)	4. (c)	5. (b)	6. (c)	7. (b)	8. (c)	9. (a)	10. (c)
11. (b)	12. (c)	13. (c)	14. (a)	15. (a)	16. (c)	17. (b)	18. (b)	19. (b)	20. (c)
21. (b)	22. (a)	23. (d)	24. (c)	25. (a)	26. (d)	27. (b)	28. (c)	29. (a)	30. (b)
31. (c)	32. (b)	33. (b)	34. (a)	35. (b)	36. (d)	37. (c)	38. (b)	39. (a)	40. (c)
41. (a)	42. (d)	43. (b)	44. (c)	45. (c)	46. (c)	47. (b)	48. (b)	49. (a)	50. (b)
51. (c)	52. (c)	53. (d)	54. (a)	55. (d)	56. (d)	57. (a)	58. (d)	59. (c)	60. (c)
61. (c)	62. (b)	63. (c)	64. (b)	65. (b)	66. (a)	67. (b)	68. (c)	69. (a)	70. (d)
71. (b)	72. (b)	73. (a)	74. (c)	75. (d)	76. (a)	77. (c)	78. (a)	79. (b)	80. (d)
81. (c)	82. (b)	83. (a)	84. (b)	85. (c)	86. (a)	87. (c)	88. (b)	89. (d)	90. (b)
91. (c)	92. (d)	93. (a)	94. (b)	95. (c)	96. (d)	97. (c)	98. (a)	99. (b)	100. (a)
101. (c)	102. (c)	103. (d)	104. (b)	105. (a)	106. (b)	107. (c)	108. (d)	109. (a)	110. (d)
111. (a)	112. (b)	113. (c)	114. (d)	115. (a)	116. (b)	117 (a)	118 (c)	119. (c)	120. (d)

Exercise-2 : More Than One Correct Answers

1. (b, c)	2. (a, c)	3. (b, c)	4. (b, d)	5. (a, b, d)	6. (a, c, d)
7. (a, c)	8. (a, b, c)	9. (c, d)	10. (a, c, d)	11. (a, c)	12. (c, d)
13. (a, c)	14. (b, d)	15. (b, c, d)	16. (a, d)	17. (a, b, c, d)	18. (a, b, d)
19. (a, c, d)	20. (a, b, d)	21. (b, c)	22. (a, b, c)	23. (a, b, c, d)	24. (a, b, d)
25. (a, b, c, d)	26. (a, b, c)	27. (a, b, c)	28. (b, c, d)	29. (b, d)	30. (b, c, d)
31. (c, d)	32. (a, c, d)	33. (a, b)	34. (b, c)	35. (a, b)	36. (a, b, c)
37. (b, c)	38. (a, b, d)	39. (a, b, c)	40. (a, b, c)	41. (c, d)	42. (b, c)
43. (a, c)	44. (a, b, c)	45. (a, b, d)	46. (b, c, d)	47. (a, b, c)	48. (a, b, d)
49. (a, b, c)	50. (a, b, c)				

Exercise-3 : Linked Comprehension Type

1. (c)	2. (b)	3. (b)	4. (a)	5. (c)	6. (d)	7. (b)	8. (c)	9. (b)	10. (b)
11. (b)	12. (d)	13. (a)	14. (a)	15. (c)	16. (a)	17. (b)	18. (d)	19. (c)	20. (b)
21. (a)	22. (b)	23. (c)	24. (d)	25. (a)	26. (b)	27. (c)			

Exercise-4 : Matrix Match Type

1. (a) → P, R, S;	(b) → P, R, S;	(c) → Q, S;	(d) → Q, S
2. (a) → P, Q, R;	(b) → Q;	(c) → P, R, S;	(d) → P
3. (a) → P, S;	(b) → Q, R;	(c) → Q, S;	(d) → P, S
4. (a) → S;	(b) → Q;	(c) → S;	(d) → R
5. (a) → S;	(b) → Q;	(c) → P;	(d) → R
6. (a) → P, R, S;	(b) → P, Q, S;	(c) → P, R, S;	(d) → P, R, S

Exercise-5 : Integer Answer Type Problems

1. (5)	2. (4)	3. (4)	4. (3)	5. (3)	6. (2)	7. (4)	8. (3)

8 Amines

EXERCISE-1 ONLY ONE CORRECT ANSWER

LEVEL-1

1. Acetamide is treated separately with the following reagents. Which one of these give methylamine ?
   (a) PCl_5
   (b) Sodalime
   (c) $NaOH + Br_2$
   (d) Hot concentrated H_2SO_4
2. Reaction of $RCONH_2$ with a mixture of Br_2 and KOH gives RNH_2 as the main product. The intermediates involved in the reaction are :
   (a) $R—\overset{\overset{\large O}{||}}{C}—NHBr$
   (b) $R—NHBr$
   (c) $R—N{=}C{=}O$
   (d) $R—\overset{\overset{\large O}{||}}{C}—N\begin{matrix}\diagup Br \\ \diagdown Br\end{matrix}$
3. Which is the best method of preparing 2° amine ?
   (a) $CH_3Cl + NH_3 \longrightarrow$
   (b) $CH_3Cl \xrightarrow{KCN} \xrightarrow{Sn/HCl}$
   (c) $CH_3Cl \xrightarrow{AgCN} \xrightarrow{LiAlH_4}$
   (d) $CH_3NH_2 \xrightarrow[\Delta]{CHCl_3/KOH} \xrightarrow{Sn/HCl}$
4. Ethyl cyanide (A) can be converted to ethyl amine (B) by :
   (a) $A \xrightarrow{Sn/HCl} B$
   (b) $A \xrightarrow{H_3O^+} \xrightarrow{NH_3/\Delta} \xrightarrow{KBrO/\Delta} B$
   (c) $A \xrightarrow{LiAlH_4} B$
   (d) both (a), (c) are correct
5. In Gabriel synthesis, amine is always :
   (a) aliphatic primary amine
   (b) aliphatic secondary amine
   (c) aromatic primary amine
   (d) aromatic secondary amine
6. In Gabriel synthesis, halide may be :
   (a) benzyl halide
   (b) allyl halide
   (c) both (a) and (b)
   (d) tertiary alkyl halide
7. In the given reaction sequence $C_6H_5—CH_2—NH_2 \xrightarrow[\Delta]{CHCl_3/Alc.\ KOH} [X]$ $\xrightarrow{H_2O/NaOH} [Y]$. $[Y]$ will be :

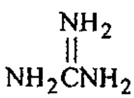
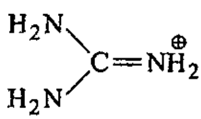
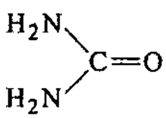
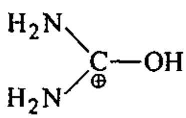
(a) $C_6H_5—CN$ (b) C_6H_5NC
(c) $C_6H_5—CH_2—NH_2$ (d) $C_6H_5—CH_2OH$

8. Predict the nature of the product $P C_6H_5CONH_2 \xrightarrow{Br_2/OD^-} P$
(a) $C_6H_5NH_2$ (b) C_6H_5NHD
(c) $C_6H_5ND_2$ (d) All of these

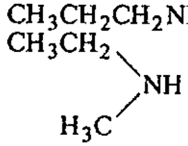
9. Which of the following statements is not correct ?
(a) Aliphatic amines are stronger bases than ammonia.
(b) Aromatic amines are stronger bases than ammonia.
(c) The alkyl group in alkyl ammonium ion more stabilizes the ion relative to the amine.
(d) The aryl group in aryl ammonium ion less stabilizes the ion relative to the amine.

10. The correct sequence regarding base strength of aliphatic amines in aqueous solution is :
(a) $R_3N > R_2NH > RNH_2 > NH_3$ (b) $R_2NH > RNH_2 > R_3N > NH_3$
(c) $R_2NH > R_3N > RNH_2 > NH_3$ (d) $RNH_2 > R_2NH > R_3N > NH_3$

11. Decreasing order of basicity of the three isomers of nitro aniline is :
(a) p - nitroaniline > o - nitroaniline > m - nitroaniline
(b) p - nitroaniline > m - nitroaniline > o - nitroaniline
(c) m - nitroaniline > p - nitroaniline > o - nitroaniline
(d) m - nitroaniline > o - nitroaniline > p - nitroaniline

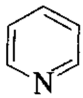
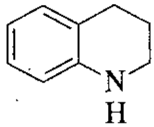
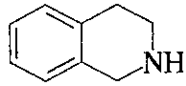
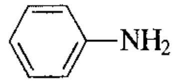
12. Strongest base is :
(a) 
(b) 
(c) 
(d) 

13. Which is the best leaving group ?
(a) N_2 (b) OH^- (c) NH_2^- (d) CH_3COO^-

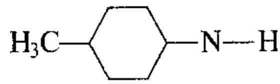
14. Which is most volatile ?
(a) $CH_3CH_2CH_2NH_2$ (b) $(CH_3)_3N$
(c) 
(d) CH_3OH

15. Which one of the following is used as phase transfer catalyst ?
(a) Primary amine (b) Quaternary ammonium salt
(c) Tertiary nitroalkane (d) Tertiary amine

16. Which of the following is most basic ?

(a)  (b)  (c)  (d) 

17. Predict about the relative boiling point of the following two amines.

(I)  (II) 

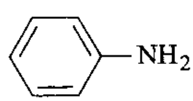
(a) Boiling point of I > II
(b) Boiling point of II > I
(c) Both should have equal boiling points
(d) It can't be predicted

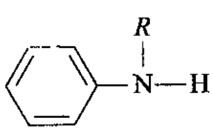
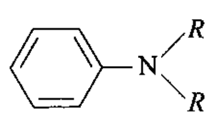
18. Carbylamine test is performed in alcoholic KOH by heating a mixture of :
(a) chloroform and silver powder
(b) trihalogenated methane and a primary amine
(c) an alkyl halide and a primary amine
(d) an alkyl cyanide and a primary amine

19. Which of the following statements is not correct ?
(a) Replacement of halogen by NH_2 in alkyl halide is a nucleophilic substitution reaction
(b) Aryl halideds show more reactivity as compared to alkyl halides in the replacements of halogen by the NH_2 group
(c) During the replacement of halogen by $—NH_2$ group, ammonia is taken in large excess so as to avoid the formation of 20 and 30 amines
(d) Tertiary alkyl halide generally produces alkene instead of the replacement of halogen by NH_2 group

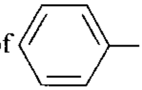
20. Which of the following statements is not correct ?
(a) Primary amines show intermolecular hydrogen bonding.
(b) Secondary amines show intermolecular hydrogen bonding.
(c) Tertiary amines show intermolecular hydrogen bonding.
(d) Amines have lower boiling points as compared to those of alcohols and carboxylic acids of comparable molar masses.

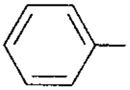
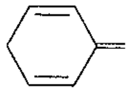
21. Which of the following amines from N—nitroso derivative when treated with $NaNO_2$ and HCl ?

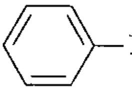
(a) CH_3NH_2 (b) 

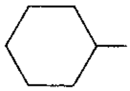
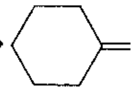
(c)  (d) 

22. Hinsberg's reagent is :
(a) phenylisocyanide
(b) benzensulphonyl chloride
(c) p - toluenesulphonic acid
(d) o - dichlorobenzene

23. Thermal decomposition of  $-\overset{\oplus}{N}Me_3OH^-$ gives :

(a)  $-NMe_3 + MeOH$ (b)  $= NMe_2 + MeOH$

(c)  $-NMe_2 + CH_2$ (d) no reaction

24.  $-CH_2\overset{+}{N}(O^-)(CH_3)_2 \xrightarrow{\Delta}$  $=CH_2 + (CH_3)_2NOH$. This is called :

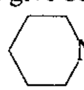
(a) Hofmann elimination (b) Cope reaction
(c) Saytzeff reaction (d) Carbyl amine reaction

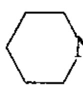
25. Cope reaction is :
(a) S_N1 intramolecular (b) S_N2 intramolecular
(c) E_1 intramolecular (d) E_2 intramolecular

26. Which of the following is Hofmann mustard oil reaction ?
(a) Reaction of primary amine with $CHCl_3$
(b) Reaction of primary amine with $CHCl_3 + KOH$
(c) Reaction of primary amine with $CS_2 + HgCl_2$
(d) Reaction of aromatic amine with iodoform

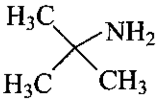
27. $\underset{(x)}{C_4H_{11}N} + HNO_2 \longrightarrow C_4H_{10}O$, X will give :
(a) Carbyl amine reaction
(b) Hofmann mustard oil reaction
(c) Diazonium salt (as the intermediate) with HNO_2
(d) None of the above

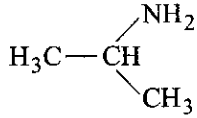
28. In the Hofmann-Bromamide rearrangement intermediate compounds are :
(a) $R—CONHBr$ (b) $\left[R—\overset{O}{\overset{\|}{C}}—\bar{N}—Br\right]Na^+$
(c) $R—N{=}C{=}O$ (d) all of these

29. Which one of the following amines will not give benzoylation reaction ?
(a) $C_6H_5—NH_2$ (b)  N—H

(c)  N—CH_3 (d) $C_6H_5—NH—CH_3$

30. Which of the following compounds can from alcohol with $NaNO_2/HCl$?

(a) 

(b) 

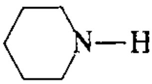
(c) $CH_3—CH_2—NH_2$

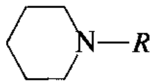
(d) All of these

31. Which of the following will not react with CS_2 ?

(a) $C_6H_5—NH_2$

(b) $CH_5—NH—CH_3$

(c) 

(d) 

32. In the given reaction $CH_3—CH_2—NH—CH_2—CH_2—Cl$

$\xrightarrow[\text{(ii) AgOH/}\Delta]{\text{(i) CH}_3\text{I (excess)}}$ $[X]$ is the major product ; $[X]$ will be :

(a) $CH_2=CH_2$

(b) $CH_2=CHCl$

(c) 1 : 1 ratio of (a) and (b)

(d) $CH_3—CH_2—Cl$

33. Predict the nature of P in the following reaction.

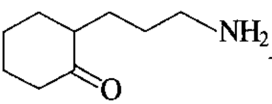
$Me_3CCH_2NH_2 \xrightarrow{\text{HONO}} P$ (main product)

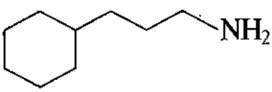
(a) Me_3CCH_2OH

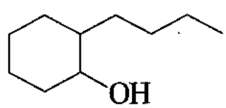
(b) $Me_2CCH=CH_2$

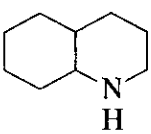
(c) $Me_2C(OH)C_2H_5$

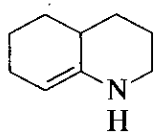
(d) $Me_3CCH_2NH(NO)$

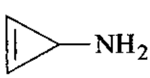
34.  $\xrightarrow{H_2/Ni}$ X. Here X is :

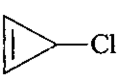
(a) 

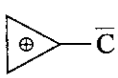
(b) 

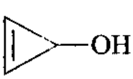
(c) 

(d) 

35.  $\xrightarrow[\text{HCl}]{\text{aq. NaNO}_2}$ P. P is :

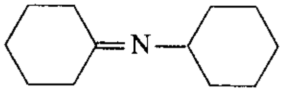
(a) 

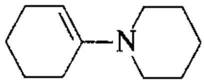
(b) 

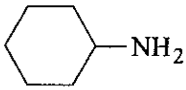
(c) 

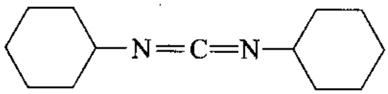
(d) none of these

36. Which of the following is an enamine ?

(a) 

(b) 

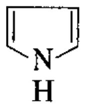
(c) 

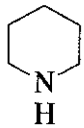
(d) 

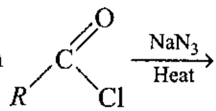
37. Which of the following amines will react with cyclohexanone to give enamine ?

(a) CH_3NH_2

(b) $(CH_3)_2NH$

(c) 

(d) 

38. The intermediates obtained in the reaction  $R-NH_2$ are :

(a) $R-\overset{\overset{\large O}{\|}}{C}-\bar{N}-\overset{\oplus}{N}\equiv N$

(b) $R-N=C=O$

(c) $R-CNO$

(d) none of these

39. Compound $[X]\,C_4H_{11}N$ reacts with p-toluene sulphonyl chloride in aqueous NaOH to give a solid. The compound $[X]$ is :

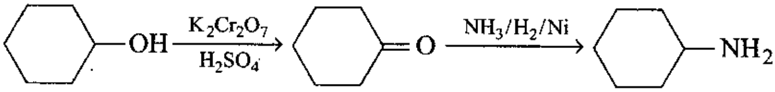
(a) $CH_3-CH_2-CH_2-CH_2-NH_2$

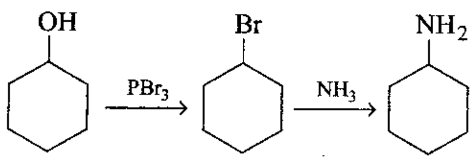
(b) $H_3C-\underset{\underset{\large CH_3}{|}}{CH}-CH_2-NH_2$

(c) $CH_3CH_2-NH-CH_2-CH_3$

(d) $H_3C-CH_2-\underset{\underset{\large CH_3}{|}}{N}-CH_3$

40. Cyclohexanol can be converted into cyclohexylamine by following two routes. Which of he following methods is expected to give good yield of cyclohexylamine ?

(a) 

(b) 

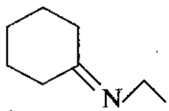
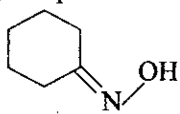
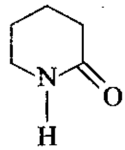
(c) both are equally suitable

(d) neither of the two

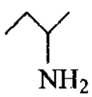
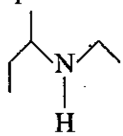
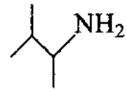
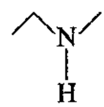
41. Which of the following will give unsymmetrical di-substituted urea after reaction with CH_3NH_2 ?
(a) $COCl_2$ (b) CH_3CH_2NCS (c) CH_3CH_2NCO (d) all of these

LEVEL-2

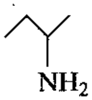
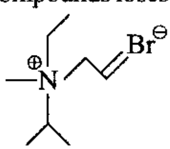
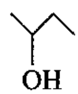
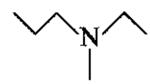
1. Which of the following compounds is an amine?

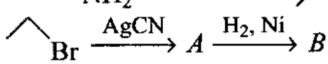
(a)  (b)  (c)  (d) 

2. Which of following compounds exists as non-resolvable racemic mixture?

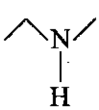
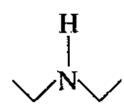
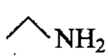
(a)  (b)  (c)  (d) 

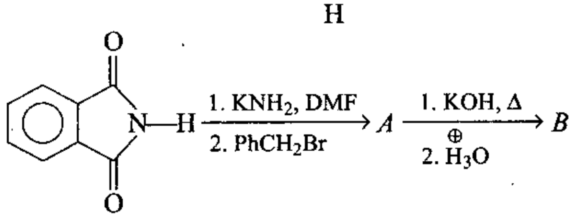
3. Which of the following compounds loses optical activity due to pyramidal inversion?

(a)  (b)  (c)  (d) 

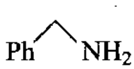
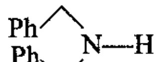
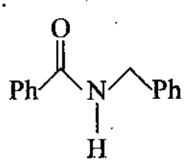
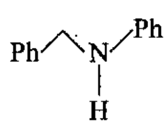
4. 

The final product (B) is :

(a)  (b)  (c)  (d) 

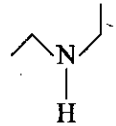
5. 

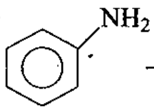
The end product B of the above reaction is :

(a)  (b)  (c)  (d) 

6. $CH_3CH_2Br \xrightarrow{AgCN} A \xrightarrow[H_3\overset{\oplus}{O}]{NaOH,\ \Delta} B$; (B) is :

(a) $CH_3CH_2NHCH_3$ (b) $CH_3CH_2CH_2NH_2$

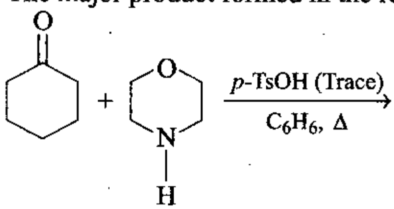
(c) $CH_3CH_2NH_2$ (d) 

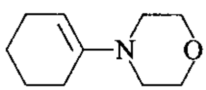
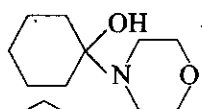
7.  $\xrightarrow[\Delta]{CHCl_3,\ KOH} X \xrightarrow[H_2O]{LiAlH_4} Y$; (Y) is :

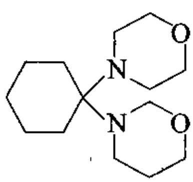
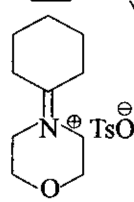
(a) $Ph-\underset{H}{\underset{|}{N}}-CH_3$ (b) $Ph-CH_2-NH_2$

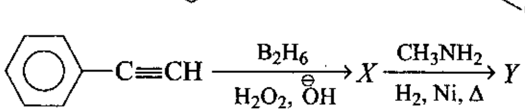
(c) $Ph-\underset{H}{\underset{|}{N}}-\overset{O}{\overset{||}{C}}-H$ (d) $Ph-\overset{\oplus}{N}\equiv\overset{\ominus}{C}$

8. The major product formed in the reaction :

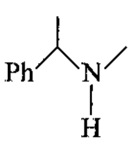
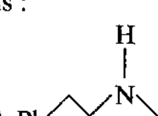
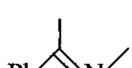


(a)  (b) 

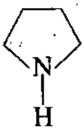
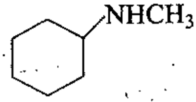
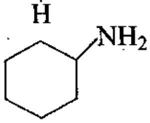
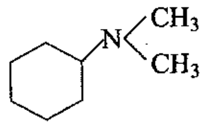
(c)  (d) 

9. 

The final product (Y) is :

(a)  (b)  (c)  (d) 

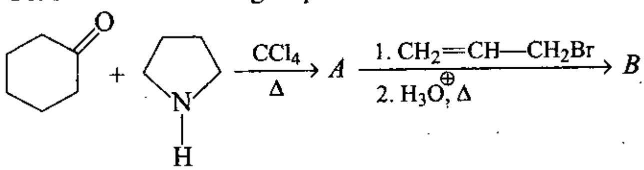
10. Among the following compounds which one will produce a Schiff base on reaction with cyclopentanone?

(a) 
(b) 
(c) 
(d) 

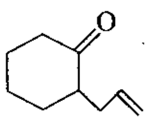
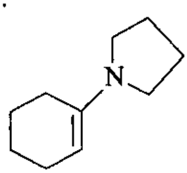
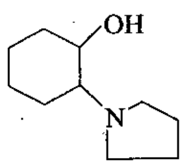
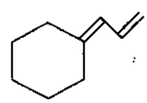
11. In which of the following reactions does the amine behaves as an acid?

(a) $(C_2H_5)_2NH + H_2PtCl_6$
(b) $CH_3NH_2 + H_2O$
(c) $(Me_2CH)_2NH + n\text{-}C_4H_9Li$
(d) $(C_2H_5)_3\ddot{N} + BF_3$

12. Consider the following sequence of reactions :



The end product (B) is :

(a) 
(b) 
(c) 
(d) 

13. Consider the following sequence of reactions :

$$H_2C=CH-CH=CH_2 \xrightarrow[CCl_4]{Br_2\ (1\ \text{Mole})} A \xrightarrow[2.\ H_2,\ Ni]{1.\ KCN\ (\text{excess})} B$$

The end product (B) is :

(a) $H_2N-(CH_2)_2-CH=CH-(CH_2)_2-NH_2$
(b) $H_2N-(CH_2)_6-NH_2$
(c) $NC-CH_2-CH=CH-CH_2-CN$
(d) $H_2C=CH-\underset{\underset{NH_2}{|}}{CH}-(CH_2)_2-NH_2$

14. $$H_3C-CH_2-\overset{\overset{CH_3}{|}}{CH}-\underset{\underset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2 + KOH} A \xrightarrow[2.\ AgOH,\ \Delta]{1.\ CH_3I\ (\text{excess})} B$$

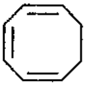
The major product (B) is :

(a) $CH_3-CH_2-CH=CH_2$

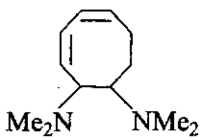
(b) $CH_3-CH_2-CH(CH_3)-C(=O)-N(CH_3)_2$

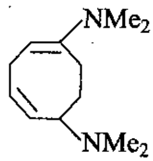
(c) $H_3C-CH=CH-CH_3$

(d) $H_3C-CH_2-CH(CH_3)-N(CH_3)_2$

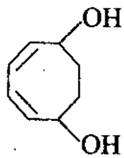
15.  $\xrightarrow[\text{2. } (CH_3)_2NH \text{ (excess)}]{\text{1. } Br_2 \text{ (1 Mole), } CCl_4} A \xrightarrow[\text{2. AgOH, } \Delta]{\text{1. } CH_3I \text{ (excess)}} B$ (Major product)

The major product (B) is :

(a) 

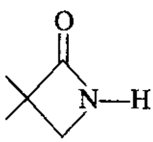
(b) 

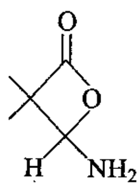
(c) 

(d) 

16. Consider the following sequence of reactions :

$$HO-C(=O)-C(CH_3)_2-C\equiv N \xrightarrow{200°C} A \xrightarrow[H_2O]{LiAlH_4} B\,;(B) \text{ is :}$$

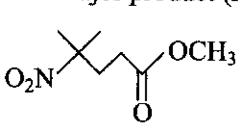
(a) 

(b) 

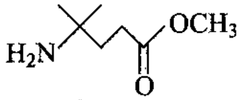
(c) $HO-H_2C-C(CH_3)_2-CH_2-NH_2$

(d) $(H_3C)_2CH-CH_2-NH_2$

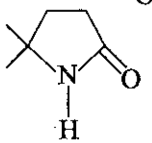
17. The major product (X) of the reaction is :

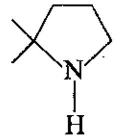


$\xrightarrow[\Delta]{H_2, Ni} X$

(a) 

(b) 

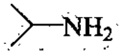
(c) 

(d) 

18. Which of the following compounds does not liberate N_2 on treatment with HNO_2?

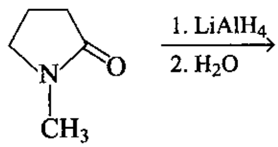
(a) $H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-NH_2$

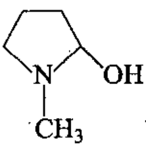
(b) $H_2N-\overset{\overset{\displaystyle O}{\|}}{C}-NH_2$

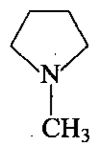
(c) 

(d) $H_3C-\underset{\underset{\displaystyle H}{|}}{N}-CH_3$

19. The product formed in the reaction is :



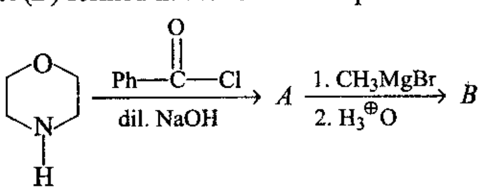
(a) 

(b) 

(c) $H_3C-\underset{\underset{\displaystyle H}{|}}{N}-(CH_2)_3-\overset{\overset{\displaystyle O}{\|}}{C}-H$

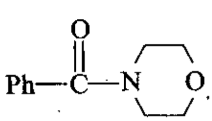
(d) $H_3C-\underset{\underset{\displaystyle H}{|}}{N}-(CH_2)_3-CH_2OH$

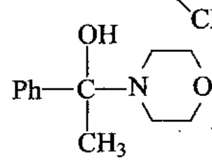
20. The major product (B) formed in the reaction sequence is :



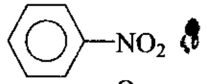
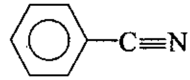
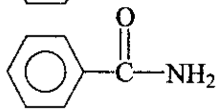
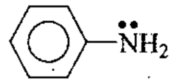
(a) $Ph-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3$

(b) $Ph-\overset{\overset{\displaystyle O}{\|}}{C}-CH(CH_3)_2$

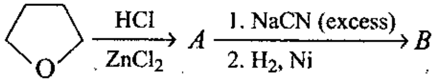
(c) 

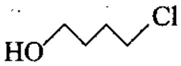
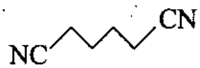
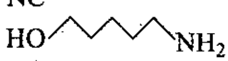
(d) 

21. An organic compound (A) on reduction gives a compound (B) which on reaction with $CHCl_3$ and NaOH form (C). The compound (C) on catalytic reduction gives N-methylaniline. The compound (A) is :

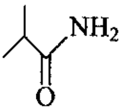
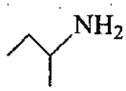
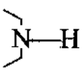
(a) 
(b) 
(c) 
(d) 

22. The major end product (B) of the reaction :



(a) 
(b) 
(c) 
(d) 

23. Which one among the following is expected to form a secondary alcohol on treatment with HNO_2?

(a) 
(b) 
(c) 
(d) 

24. The end product (B) of the reaction sequence :

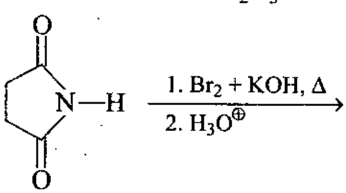
$$C_2H_5-\underset{\underset{H}{|}}{N}-CH_3 \xrightarrow[NaOH]{Ph-\overset{\overset{O}{\|}}{C}-Cl} A \xrightarrow[H_2O]{LiAlH_4} B$$

(a) $Ph-\overset{\overset{O}{\|}}{C}-N(CH_3)(C_2H_5)$

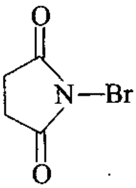
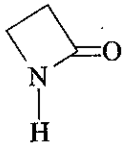
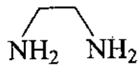
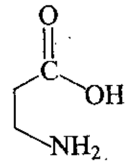
(b) $Ph-CH_2-N(CH_3)(C_2H_5)$

(c) $Ph-\overset{\overset{OH}{|}}{CH}-N(CH_3)(C_2H_5)$

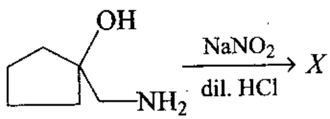
(d) $Ph-N(CH_3)(C_2H_5)$

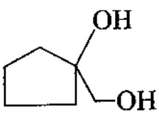
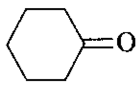
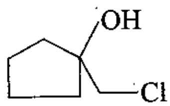
25. 

The product of above reaction is :

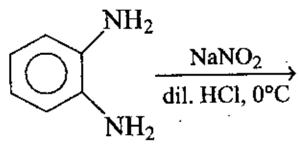
(a)  (b)  (c)  (d) 

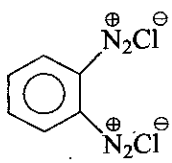
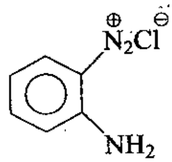
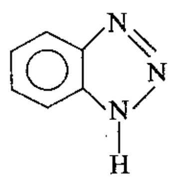
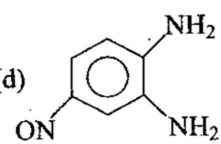
26. The major product (X) of the reaction is :



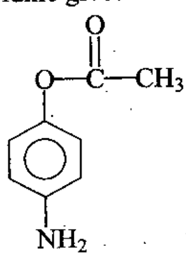
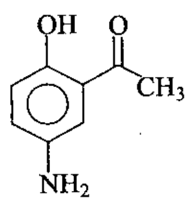
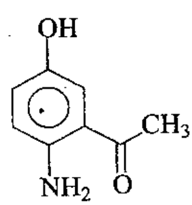
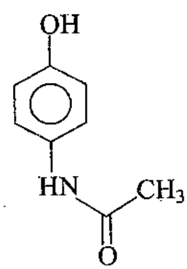
(a)  (b)  (c)  (d) 

27. The major product of the reaction is :

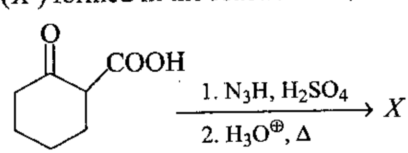


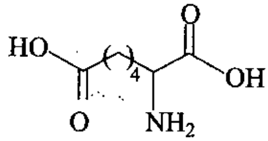
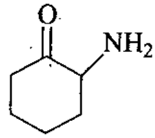
(a)  (b)  (c)  (d) 

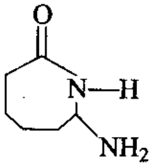
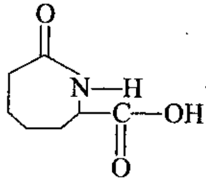
28. The reaction of *p*-aminophenol with one mole of acetyl chloride in presence of pyridine gives :

(a)  (b)  (c)  (d) 

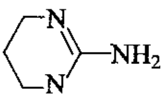
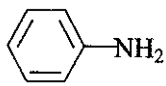
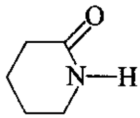
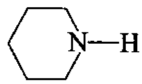
29. The major product (X) formed in the reaction :



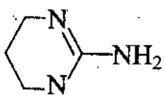
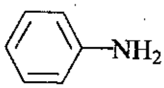
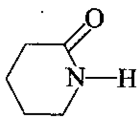
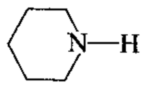
(a)  (b) 

(c)  (d) 

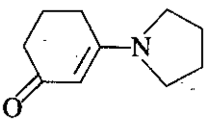
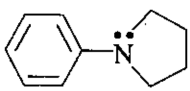
30. Which of the following is the strongest Bronsted acid?

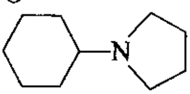
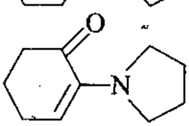
(a)  (b)  (c)  (d) 

31. Which of the following is the strongest Bronsted base?

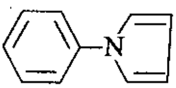
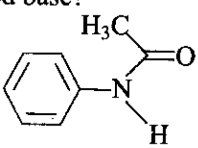
(a)  (b)  (c)  (d) 

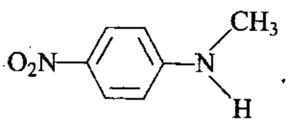
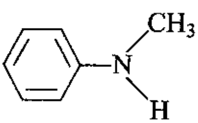
32. Which of the following is the weakest Bronsted base?

(a)  (b) 

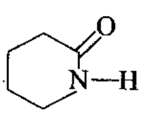
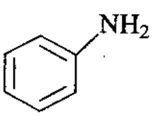
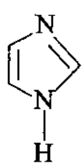
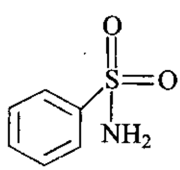
(c)  (d) 

33. Which of the following is strongest Bronsted base?

(a)  (b) 

(c)  (d) 

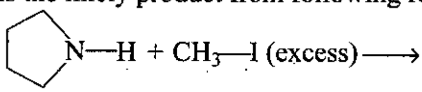
34. For the following compounds, which is the strongest base and which is strongest acid?

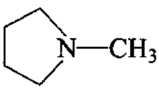
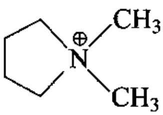
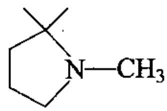
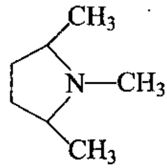
   

I II III IV

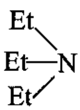
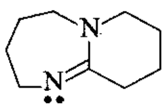
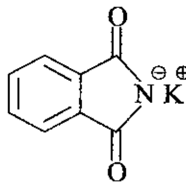
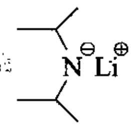
(a) II = Strongest base, I = Strongest acid
(b) IV = Strongest base, III = Strongest acid
(c) III = Strongest base, IV = Strongest acid
(d) II = Strongest base, III = Strongest acid

35. Which compound is the likely product from following reaction?

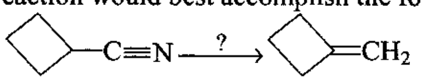


(a)  (b)  (c)  (d) 

36. Which of these is the strongest base?

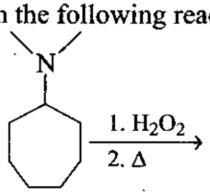
(a)  (b)  (c)  (d) 

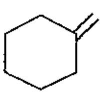
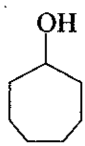
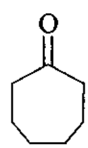
37. What sequence of reaction would best accomplish the following reaction?



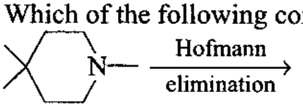
(a) $LiAlH_4, 3CH_3I/AgOH, \Delta$
(b) $LiAlH_4, P_2O_5/\Delta$
(c) 20% $H_2SO_4/\Delta, P_2O_5/\Delta$
(d) H_2, Pd - $BaSO_4$

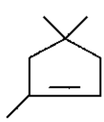
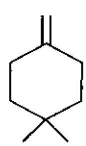
38. What is the likely product from the following reaction?



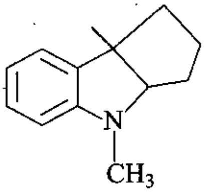
(a)  (b)  (c)  (d) 

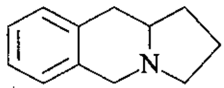
39. Repeated Hofmann elimination reaction (exhaustive methylation followed by heating with AgOH) will often remove a nitrogen atom from an amine molecule. Which of the following compounds is the likely product in this case?

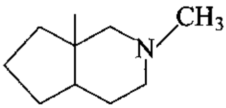


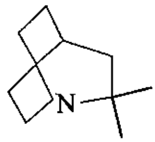
(a)  (b)  (c)  (d) 

40. Only one of the following amines will lose its nitrogen atom as trimethyl amine by repeated Hofmann elimination reactions :

(a) 

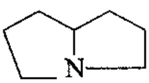
(b) 

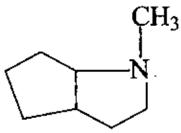
(c) 

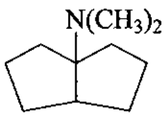
(d) 

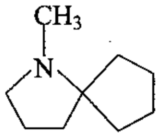
41. The nitrogen atom in each of the following tertiary amines may be removed as trimethyl amine by repeated Hofmann elimination.

Which of the following amines requires the greater number of Hofmann sequence to accomplish this?

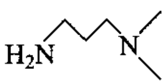
(a) 

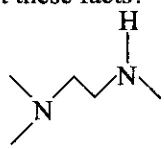
(b) 

(c) 

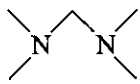
(d) 

42. The Hinsberg test of a $C_5H_{14}N_2$ compound produces a solid that is insoluble in 10% aq. NaOH. This solid derivative dissolves in 10% aq. H_2SO_4. Which of the following would best fit these facts?

(a) 

(b) 

(c) 

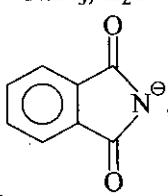
(d) 

43. What set of conditions would be useful for preparing a 2° amine?

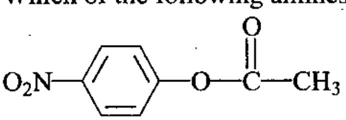
(a) 2° R—Br + $NaNH_2$

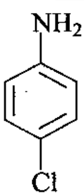
(b) 2° R—Br + NaN_3, H_2/Pt

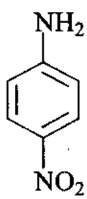
(c) 1° R—NH_2 + 1° RCHO, H_2 and Pt

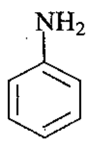
(d) 1° R—Br  , H_3O/Δ

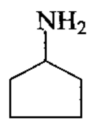
44. Which of the following amines reacts most rapidly with

 ?

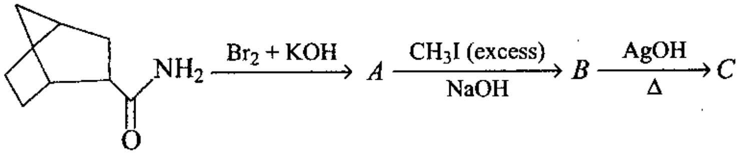
(a) 

(b) 

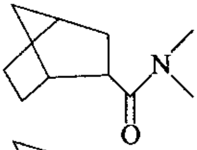
(c) 

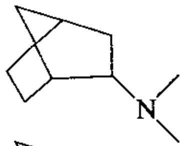
(d) 

45. Consider the following sequence of reactions ;



Identify product C :

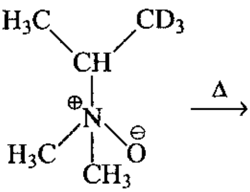
(a) 

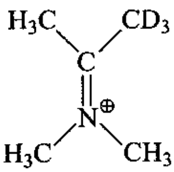
(b) 

(c) 

(d) 

46. The major product formed in the following reaction is :



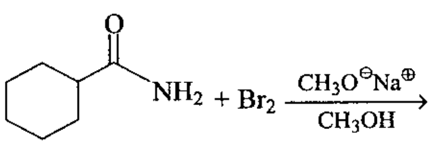
(a) 

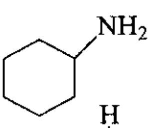
(b) $H_3C—CH═CD_2$

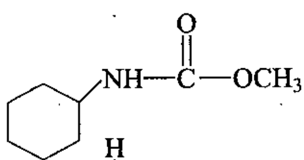
(c) $H_2C═CH—CD_3$

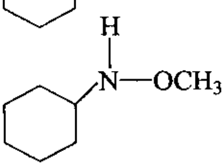
(d) $H_2C═N—CH_3$

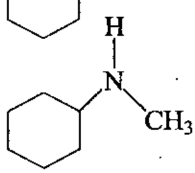
47. The product formed in the reaction is :

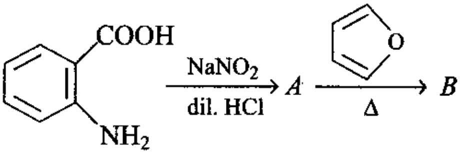


(a) 

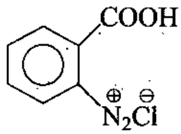
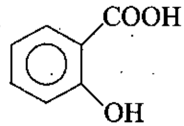
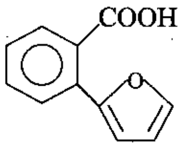
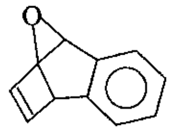
(b) 

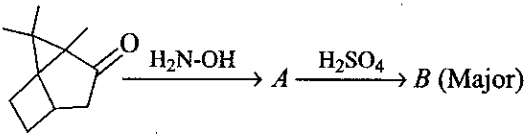
(c) 

(d) 

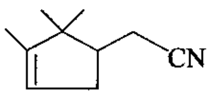
48. 

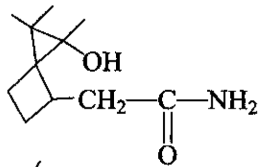
Identify B :

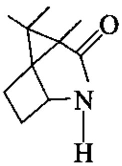
(a)  (b)  (c)  (d) 

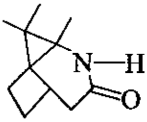
49. 

The final product (B) is :

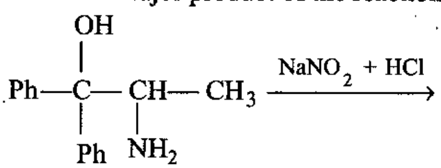
(a) 

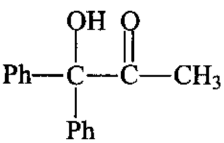
(b) 

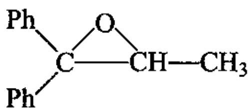
(c) 

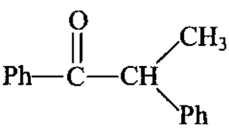
(d) 

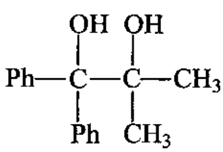
50. The final major product of the reaction is :



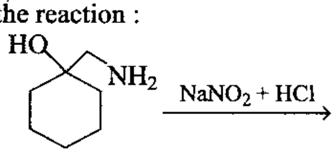
(a) 

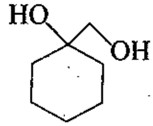
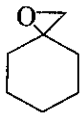
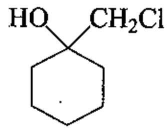
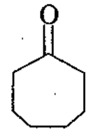
(b) 

(c) 

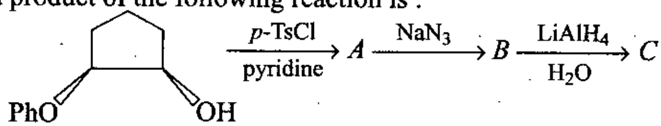
(d) 

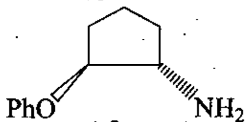
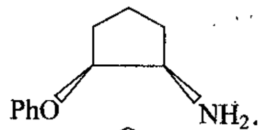
51. The major product of the reaction :

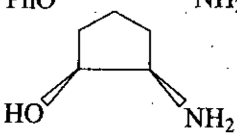
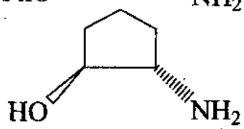


(a)  (b)  (c)  (d) 

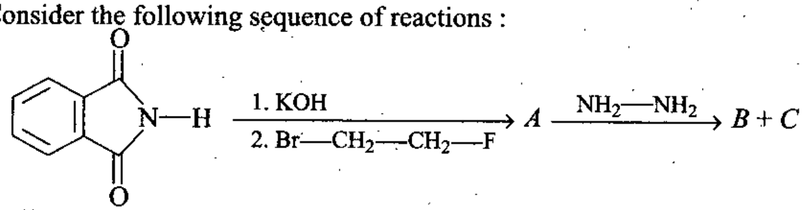
52. The end product of the following reaction is :



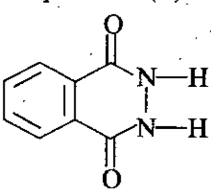
(a)  (b) 

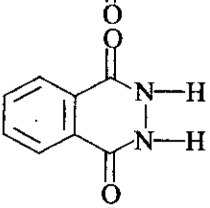
(c)  (d) 

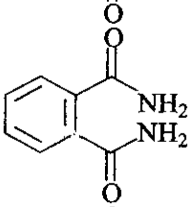
53. Consider the following sequence of reactions :

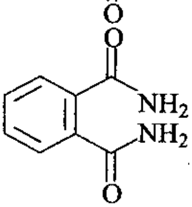


The products (B) and (C) are :

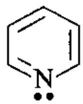
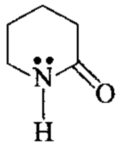
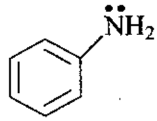
(a)  $+ NH_2—CH_2—CH_2—Br$

(b)  $+ NH_2—CH_2—CH_2—F$

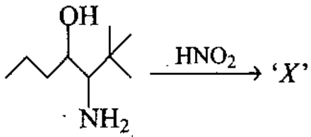
(c)  $+ NH_2—CH_2—CH_2—F$

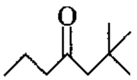
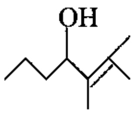
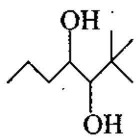
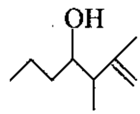
(d)  $+ NH_2—CH_2—CH_2—Br$

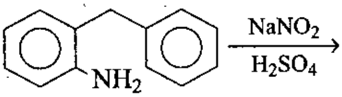
54. Which of the following compounds will react with cyclopentanone to form an enamine?

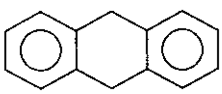
(a)  (b)  (c)  (d) 

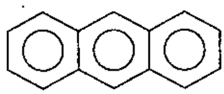
55. Predict the major product 'X' in the following reaction :

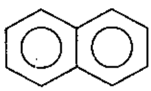


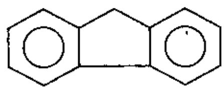
(a)  (b)  (c)  (d) 

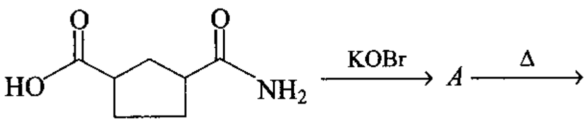
56.  (A) ; Product of this reaction is :

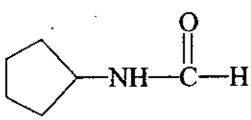
(a) 

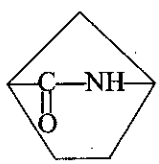
(b) 

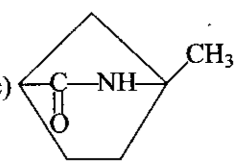
(c) 

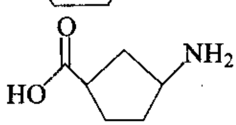
(d) 

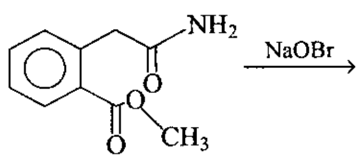
57.  B ; Compound B is :

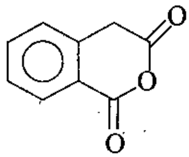
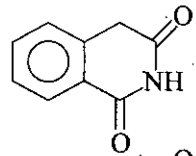
(a) 

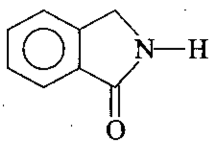
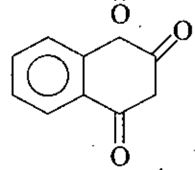
(b) 

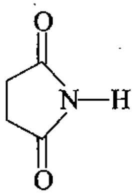
(c) 

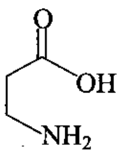
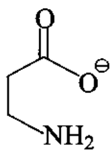
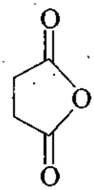
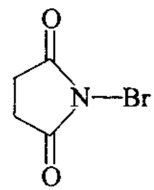
(d) 

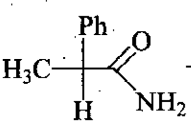
58.  (X) ; Product (X) is :

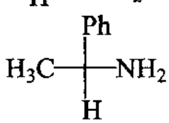
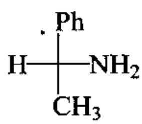
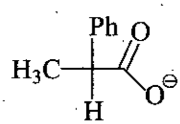
(a) 
(b) 

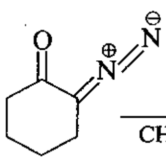
(c) 
(d) 

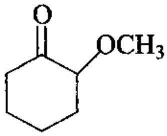
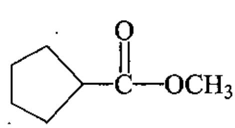
59.  $\xrightarrow{Ca(OH)_2 + Br_2}$ (X); Product (X) is :

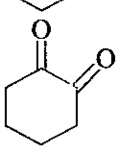
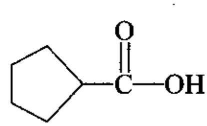
(a) 
(b) 
(c) 
(d) 

60.  $\xrightarrow{KOBr}$ (Y) ; Product (Y) of the reaction :

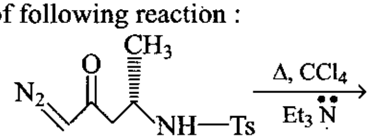
(a) 
(b) 
(c) Mixture of (a) and (b)
(d) 

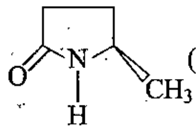
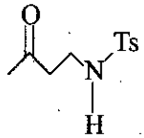
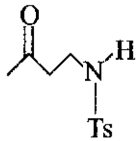
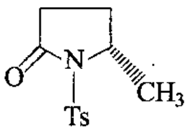
61.  $\xrightarrow[CH_3OH]{\Delta}$ (X) ; Find (X) :

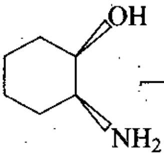
(a) 
(b) 

(c) 
(d) 

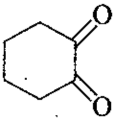
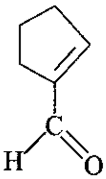
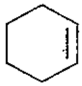
62. Predict the product of following reaction :

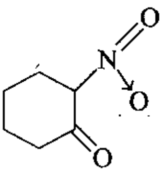


(a)  (b)  (c)  (d) 

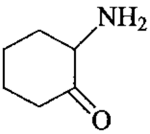
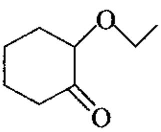
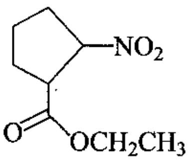
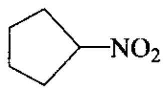
63.  $\xrightarrow{\text{Pb(OAc)}_4} K \xrightarrow{H_3\overset{\oplus}{O},\ \Delta} L \xrightarrow{\overset{\ominus}{O}H} M$

Final product M is :

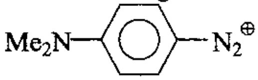
(a)  (b)  (c)  (d) 

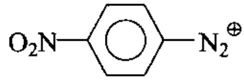
64.  $\xrightarrow{\overset{\ominus}{O}H,\ Br_2} N \xrightarrow{CH_3CH_2\overset{\ominus}{O}} O$

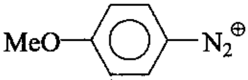
Final product 'O' is :

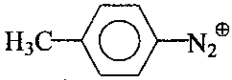
(a)  (b)  (c)  (d) 

65. Consider the following diazonium ion :


'P'


'Q'


'R'


'S'

The order of reactivity towards diazo coupling with phenol in presence of dil. NaOH :

(a) $P > Q > R > S$ (b) $Q > S > R > P$ (c) $P > R > S > Q$ (d) $S > R > Q > P$

66. Reaction I $\quad Ph-\overset{\overset{\large O}{||}}{C}-NH_2 \xrightarrow{\overset{\ominus}{O}D,\ Br_2} A$

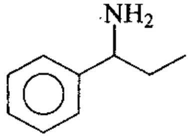
Reaction II $\quad Ph-\overset{\overset{\large O}{||}}{C}-ND_2 \xrightarrow{\overset{\ominus}{O}H,\ Br_2} B$

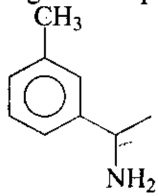
Products A and B are :

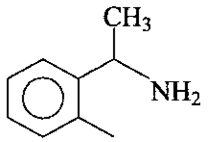
(a) Ph—NH_2 and Ph—ND_2 (b) Ph—ND_2 and Ph—NH_2

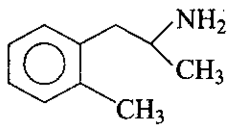
(c) Both Ph—NH_2 (d) Both Ph—ND_2

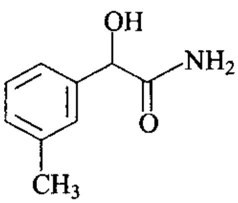
67. An organic compound (A) $C_9H_{13}N$ dissolves in dil. HCl and releases N_2 with HNO_2 giving an optically active alcohol. Alcohol on oxidation gives dicarboxylic acid, which on heating form anhydride. The organic compound 'A' is :

(a) 

(b) 

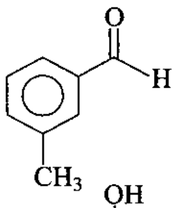
(c) 

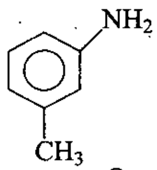
(d) 

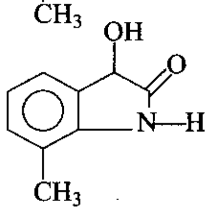
68. 

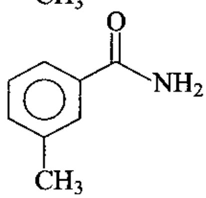
$\xrightarrow{Br_2 + KOH}$ Product

The final product is :

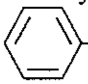
(a) 

(b) 

(c) 

(d) 

69. Identify 'X' in the following sequence of reaction :

$-\overset{\oplus}{N}\equiv N\overset{\ominus}{Cl} \xrightarrow[KCN]{CuCN} P \xrightarrow{LiAlH_4} Q \xrightarrow{HNO_2} X$

(a) Benzoic acid (b) Phenyl acetic acid

(c) Benzyl alcohol (d) Benzamide

70. Which sequence of steps will be able to produce 3, 3′-dinitro-biphenyl from benzene?

(a) $HNO_3/H_2SO_4, Cl_2/FeCl_3$, Na/ether

(b) $Cl_2/FeCl_3, HNO_3/H_2SO_4$, Na/ether

(c) $Cl_2/FeCl_3, H_2SO_4$, Na/ether

(d) $I_2/HIO_3, Cl_2/FeCl_3, C_6H_5NO_2$

71. 1°, 2° and 3° nitroalkane can be identified by action of :

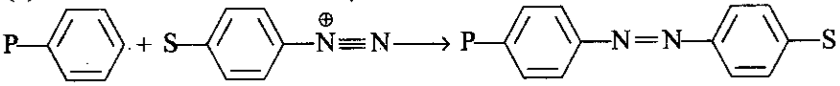
(a) $HNO_3 + NaOH\,(aq.)$ (b) $CHCl_3 + NaOH\,(aq.)$

(c) $HNO_2 + NaOH\,(aq.)$ (d) $CHCl_3 + KOH\,(alc.)$

72. A compound '*X*' when reacted with PCl_5 and then with NH_3 gives '*Y*'. When '*Y*' treated with Br_2 and KOH produced '*Z*'. *Z* on treatment with $NaNO_2$ + HCl at 0°C and then boiling produced *ortho*-cresol. Compound '*X*' is :

(a) *o*–toluic acid (b) *o*–chlorotoluene

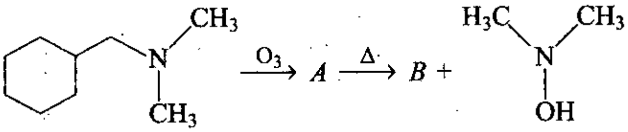
(c) *o*–bromotoluene (d) *m*–toluic acid

73. 

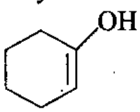
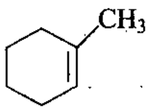
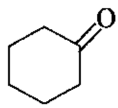
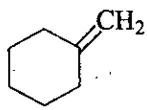
For such kind of diazo-coupling reaction the suitable substituents *P* and *S* are respectively :

(a) $-NH_2$ and $-OCH_3$ (b) $-NO_2$ and $-\overset{\overset{O}{\|}}{C}-H$

(c) $-NH_2$ and $-NHCH_3$ (d) $-OCH_3$ and $-NO_2$

74. 

Identify '*B*' :

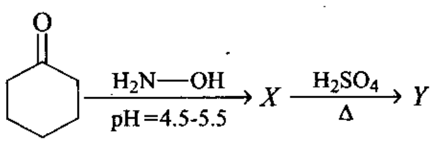
(a)  (b)  (c)  (d) 

75. The final product *B* obtained in the reaction is :

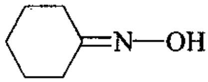
$$(CH_3CH_2)_3N \xrightarrow{H_2O_2} A \xrightarrow{\Delta} B + H_2C{=}CH_2$$

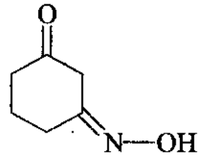
(a) $(CH_3CH_2)_2\ddot{N}-OH$ (b) $(H_2C{=}CH)_2$

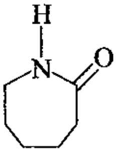
(c) $H_3C-CH{=}CH_2$ (d) $(CH_3CH_2)_3N-OH$

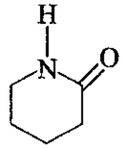
76. 

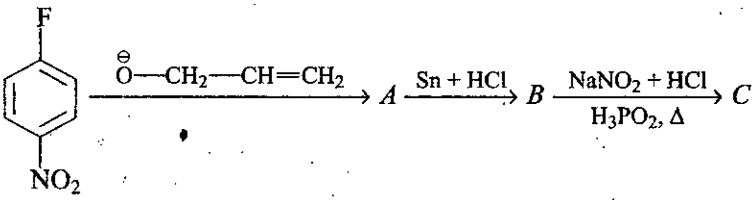
Find out *Y* of the reaction :

(a) 

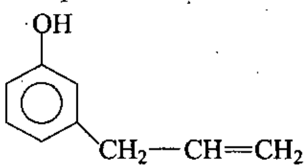
(b) 

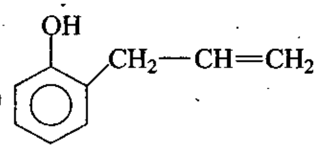
(c) 

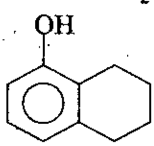
(d) 

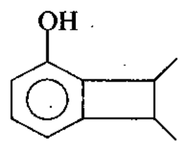
77. 

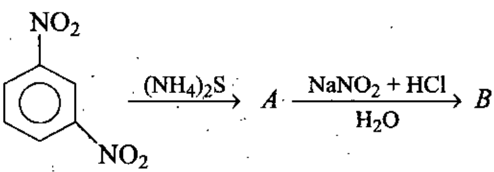
The compound C is :

(a) 

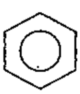
(b) 

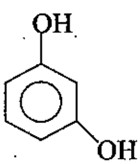
(c) 

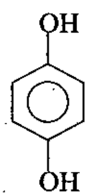
(d) 

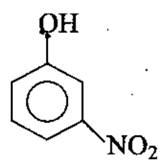
78. 

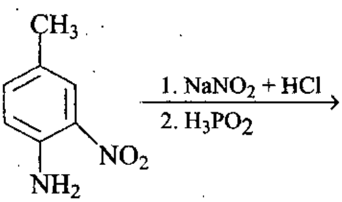
The compound B is :

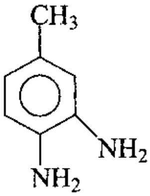
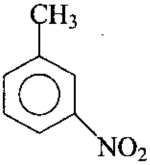
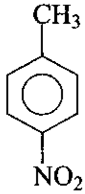
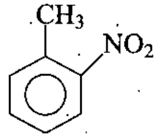
(a) 

(b) 

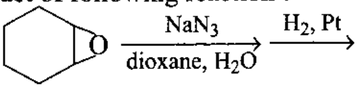
(c) 

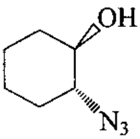
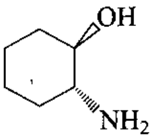
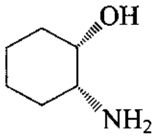
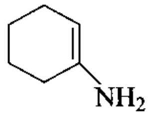
(d) 

79. 

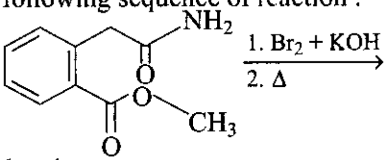
(a)  (b)  (c)  (d) 

80. Identify the final product of following reaction :

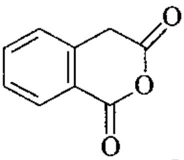
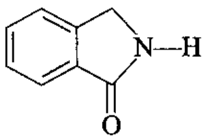


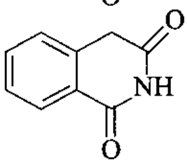
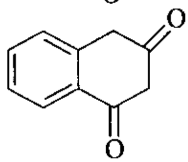
(a)  (b)  (c)  (d) 

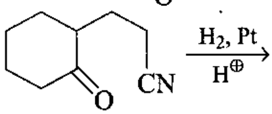
81. Consider the following sequence of reaction :



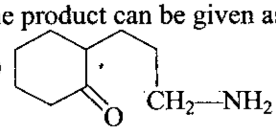
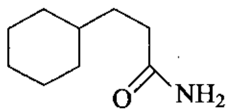
The final product is :

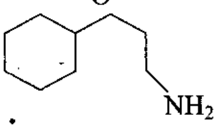
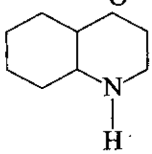
(a)  (b) 

(c)  (d) 

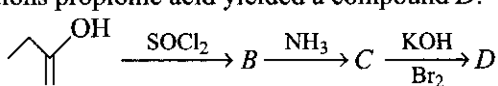
82. 

The product can be given as :

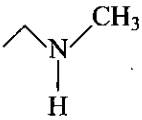
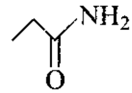
(a)  (b) 

(c)  (d) 

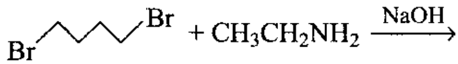
83. In a set of reactions propionic acid yielded a compound *D*.

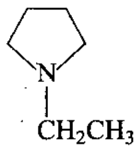


The structure of D would be :

(a)  (b)  (c)  (d) 

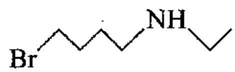
84. What would be the final product of reaction :



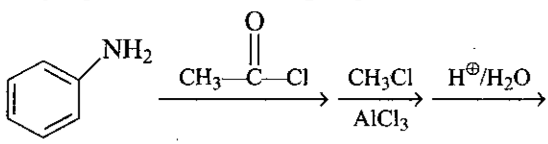
(a) 

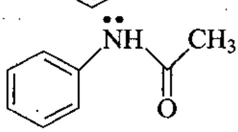
(b) 

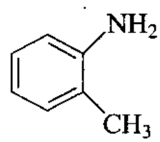
(c) 

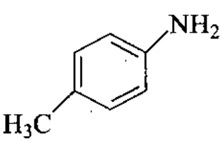
(d) 

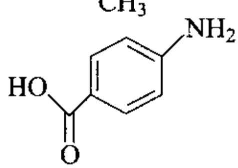
85. Identify major product of following sequence of reaction :



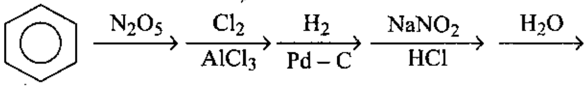
(a) 

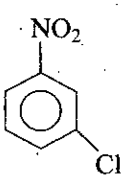
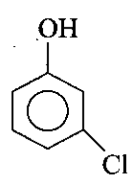
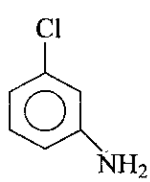
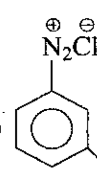
(b) 

(c) 

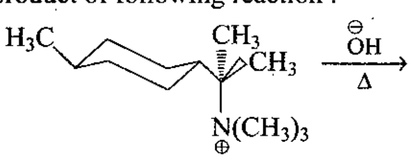
(d) 

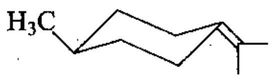
86. Identify the final product of following sequence of reaction :

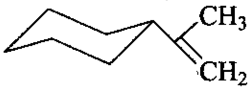


(a)  (b)  (c)  (d) 

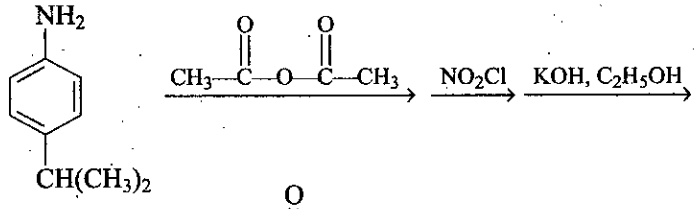
87. Identify the major product of following reaction :

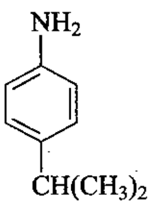
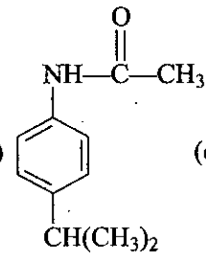
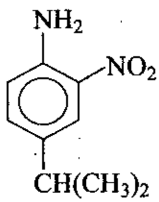
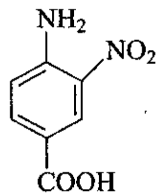


(a)  (b) 

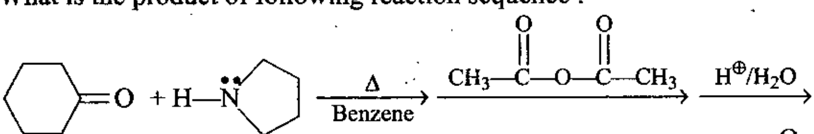
(c)  (d) none of these

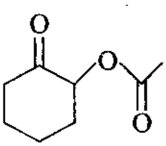
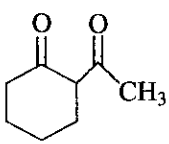
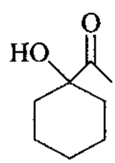
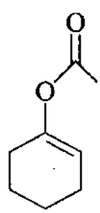
88. Identify final product of following sequence of reaction :



(a)  (b)  (c)  (d) 

89. What is the product of following reaction sequence :



(a)  (b)  (c)  (d) 

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

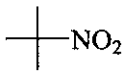
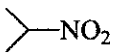
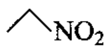
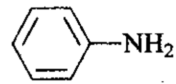
1. The presence of primary amine can be confirmed by its reaction with :
   (a) HNO_2 (b) $CHCl_3 + NaOH$
   (c) CS_2 and $HgCl_2$ (d) H_2SO_4
2. Which of the following reactions can be used to make ethyl isocyanide?
   (a) $CH_3CH_2NH_2 + CHCl_3 \xrightarrow[\Delta]{KOH}$ (b) $CH_3CH_2Br + AgCN \longrightarrow$
   (c) $CH_3CH_2{-}NH{-}\underset{\underset{O}{\|}}{C}{-}H \xrightarrow{POCl_3}$ (d) $CH_3CH_2Br + KCN \longrightarrow$

3. By which of the following reactions can methylcyanide be prepared?

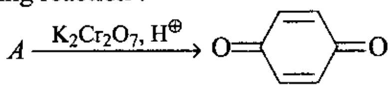
(a) $CH_3Br \xrightarrow[DMF]{KCN}$ (b) $CH_3NH_2 + CHCl_3 \xrightarrow{KOH}$

(c) $CH_3—CH=N—OH \xrightarrow[\Delta]{P_2O_5}$ (d) $CH_3—\overset{\overset{\displaystyle O}{\|}}{C}—NH_2 \xrightarrow[\Delta]{P_4O_{10}}$

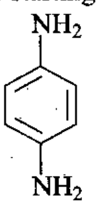
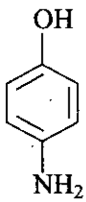
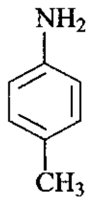
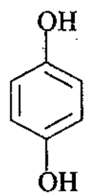
4. Which of the following compounds react with HNO_2?

(a)  (b)  (c)  (d) 

5. Consider the following reaction :

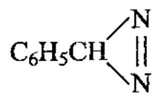


The starting substance 'A' can be :

(a)  (b)  (c)  (d) 

6. $C_6H_5—CH_2—I \xrightarrow[\Delta]{NaN_3}$ Products

Reaction is assumed to involve nitrene as intermediate, then various possible products are :

(a) $C_6H_5CH_2NH_2$ (b) $C_6H_5N{=}CH_2$ (c) $C_6H_5CH{=}NH$ (d) 

7. Which of the following can give 1° amine?

(a) $Ph—\underset{}{\overset{\overset{\displaystyle CH_3}{|}}{CH}}—OH \xrightarrow{NaCN,\ H^{\oplus}}$

(b) $Ph—CH=CH—\overset{\overset{\displaystyle O}{\|}}{C}—NH_2 \xrightarrow[CH_3OH]{NaOCl}$

(c) $Ph—C{\equiv}C—\overset{\overset{\displaystyle O}{\|}}{C}—NH_2 \xrightarrow{NaOBr}$

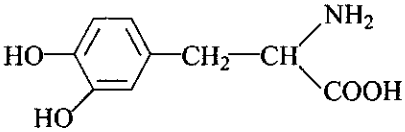
(d) $Ph—\overset{\overset{\displaystyle O}{\|}}{C}—Cl \xrightarrow[\Delta]{NaN_3} \xrightarrow{LiAlH_4}$

8. Which of the following can distinguish?

$$CH_3-\underset{\underset{}{}}{\overset{\overset{CH_3}{|}}{C}H}-NH_2 \text{ and } CH_3-CH_2-\overset{\overset{H}{|}}{N}-CH_3$$

(a) $(COOC_2H_5)_2$ (b) $NaNO_2 + HCl$ (c) $CS_2, HgCl_2$ (d) Ag_2O/Δ

9. Dopamine is a drug used in the treatment of Parkinson's disease :



Which of the following statements about this compound are correct?

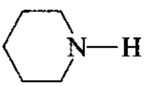
(a) It can exist only in optically active forms

(b) One mole will react with 3 mole of NaOH to form a salt

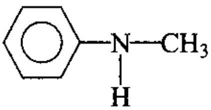
(c) It can exist as a zwitter ion in the aqueous solution

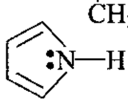
(d) It gives nitroso compound on treatment with HNO_2

10. Which of the following give nitrosoamine on treatment with HNO_2?

(a) 

(b) $H_3C-\underset{\underset{CH_3}{|}}{C}H-NH_2$

(c) 

(d) 

11. Which of the following sequence of reagent is the good means to furnish the conversion?

$$R-CH_2OH \longrightarrow R-CH_2NH_2$$

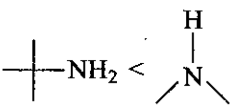
(a) $KMnO_4, SOCl_2, NH_3, \Delta,$ NaOBr

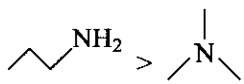
(b) $SOCl_2$, NaCN, H_2/Ni

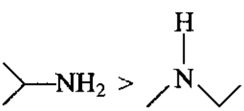
(c) CrO_3 in dilute acetone, NH_3, H_2, Ni

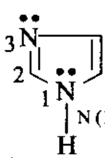
(d) Cu, 300°C, NH_2, $LiAlH_4$

12. Choose the correct comparisons of basicity :

(a) 

(b) 

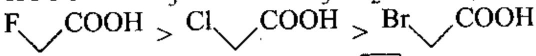
(c) 

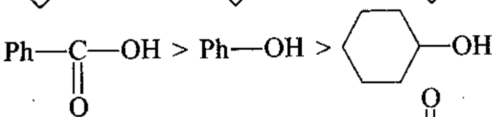
(d) 

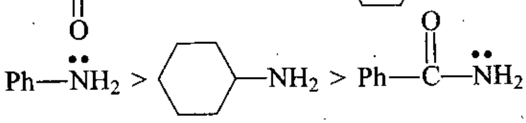
N (1) > N (3)

13. Which of the following arrangements are correct with respect to the property of the compounds indicated in the parentheses?

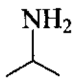
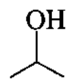
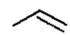
(a) $HCOOH > CH_3COOH > CH_3CH_2COOH$ (Acidic strength)

(b)  (Acidic strength)

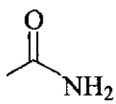
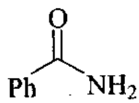
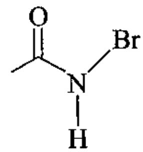
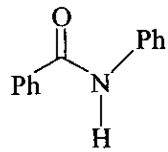
(c)  (Acidic strength)

(d)  (Base strength)

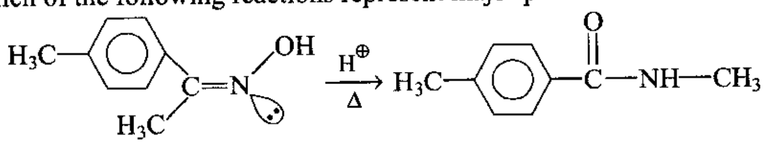
14. Which of the following products are formed when 1-propanamine is treated with $NaNO_2 + HCl$?

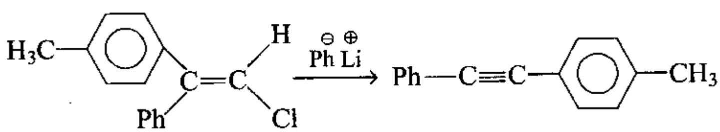
(a)  (b)  (c)  (d) 

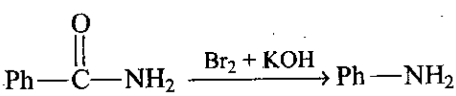
15. Which of the following will give Hofmann-Bromoamide reaction?

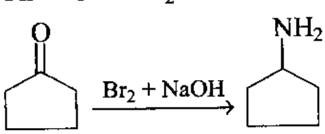
(a)  (b)  (c)  (d) 

16. Which of the following reactions represent major products?

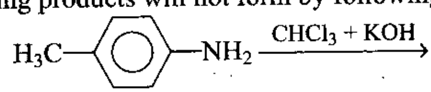
(a) 

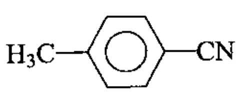
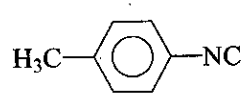
(b) 

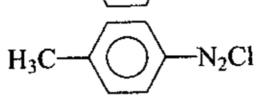
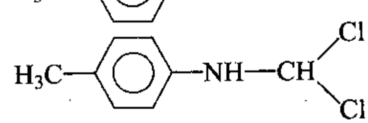
(c) 

(d) 

17. Which of the following products will not form by following reaction?



(a)  (b) 

(c)  (d) 

18. $Ph-\overset{O}{\overset{\|}{C}}-NH_2 + Ph-CH_2-\overset{O}{\overset{\|}{C}}-\overset{15}{N}H_2 \xrightarrow{\overset{\ominus}{O}H + Br_2} A + B$

Products A and B are :

(a) $Ph-NH_2$ (b) $Ph-CH_2\overset{15}{N}H_2$

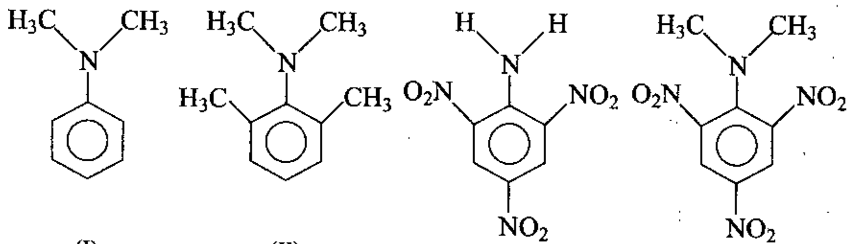
(c) $Ph-CH_2-NH_2$ (d) $Ph-\overset{15}{N}H_2$

19. Reaction involves isocyanate as intermediate product :

(a) Curtius rearrangement (b) Lossen rearrangement

(c) Schmidt rearrangement (d) Hofmann rearrangement

20. Consider the structures :



(I) (II) (III) (IV)

Which of the following statements are correct?

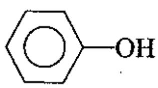
(a) Basic strength of II is greater than I

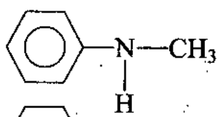
(b) Basic strength of II is less than that of I

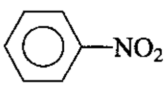
(c) Basic strength of IV is greater than III

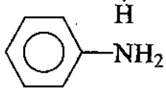
(d) Basic strength of IV is less than that of III

21. Which of the following give Liebermann nitroso reaction?

(a) 

(b) 

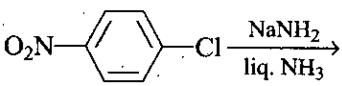
(c) 

(d) 

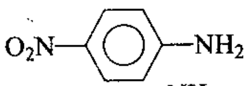
22. Which are related with Curtius rearrangement?

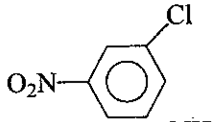
(a) NaN_3 (b) $R-NH_2$

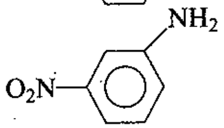
(c) $R-\overset{O}{\overset{\|}{C}}-Cl$ (d) $R-\overset{O}{\overset{\|}{C}}-OH$

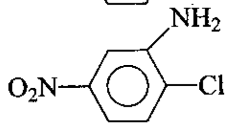
23. 

The possible products are :

(a) 

(b) 

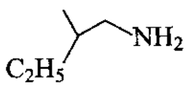
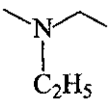
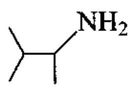
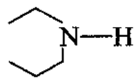
(c) 

(d) 

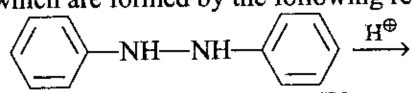
24. Which of the following give Schiff base with aldehyde?
(a) $CH_3CH_2NH_2$
(b) $C_6H_5—CH_2—NH_2$
(c) $C_6H_5—NH_2$
(d) $C_6H_5—NO_2$

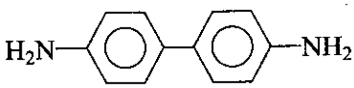
25. Which of the following give aniline by reduction of nitrobenzene?
(a) $H_2/Pd–C$
(b) $Sn + HCl$
(c) $Cu + HCl$
(d) $(NH_4)_2S$

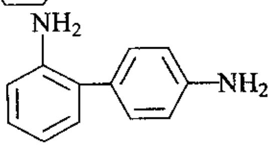
26. Optically active amine having molecular formula $C_5H_{13}N$ on reaction with $NaNO_2 + HCl$ produces, 3° optically inactive alcohol. Find out structures of amines :

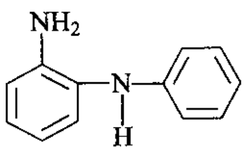
(a) 
(b) 
(c) 
(d) 

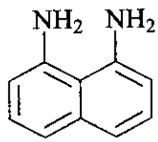
27. Find out products which are formed by the following reaction :



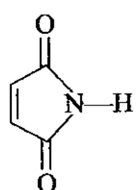
(a) 

(b) 

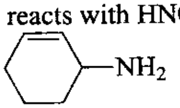
(c) 

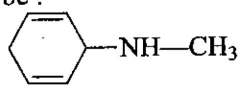
(d) 

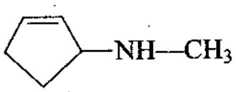
28. Which of the following is soluble in dil. aqueous HCl ?

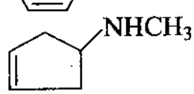
(a) $C_6H_5NH_2$ (b) $C_6H_5CH_2NH_2$ (c) $C_6H_5CONH_2$ (d) 

29. The structural form of a compound A ($C_6H_{11}N$) is resolvable, dissolve in dil. HCl and reacts with HNO_3. Compound A could be :

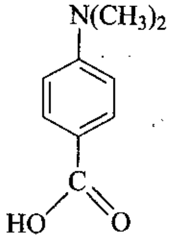
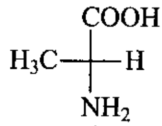
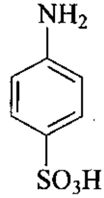
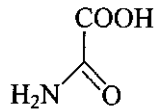
(a) 

(b) 

(c) 

(d) 

30. Which of the following basically exist as dipolar ion ?

(a) 
(b) 
(c) 
(d) 

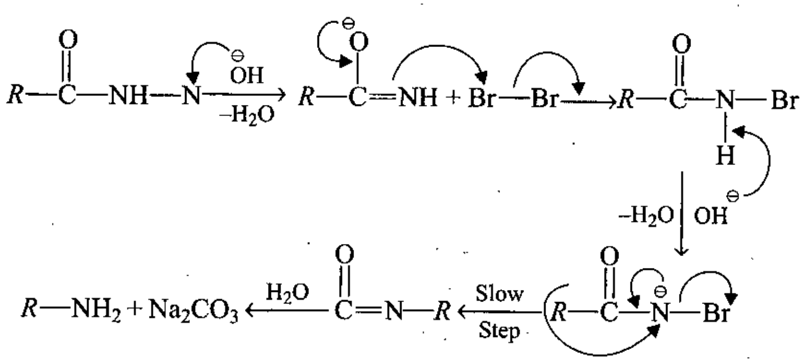
EXERCISE-3 LINKED COMPREHENSION TYPE

Passage-1

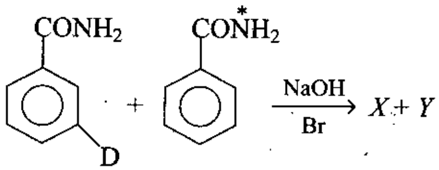
The conversion of an amide by action of NaOH and Br_2 to primary amine that has one carbon less than the starting amide is known as Hofmann-Bromoamide reaction.

$$R-\overset{\overset{\displaystyle O}{\|}}{C}-NH_2 \xrightarrow[\text{or NaOBr}]{Br_2 + NaOH} R-NH_2 + NaBr + Na_2CO_3$$

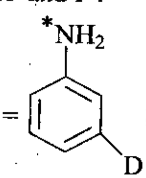
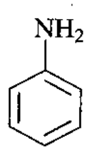
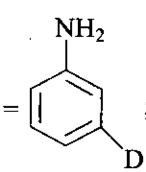
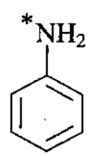
Mechanism :

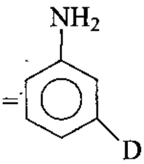


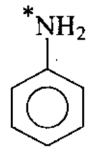
1. Number of moles of NaOH consumed in above reaction :
(a) 1 (b) 2 (c) 3 (d) 4

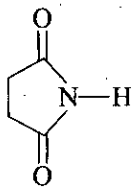
2. 

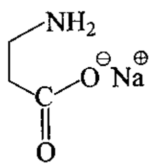
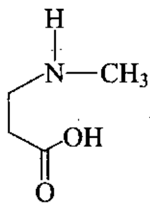
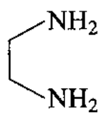
Find X and Y :

(a) $X=$  ; $Y=$ 
(b) $X=$  ; $Y=$ 

(c) $X = Y =$ 

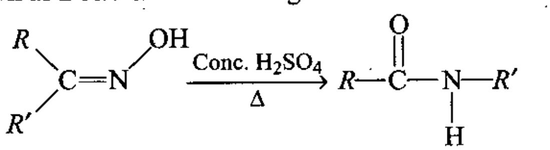
(d)  $= X = Y$

3.  $\xrightarrow{NaOBr}$ (X); Find out X :

(a)  (b)  (c)  (d) all of these

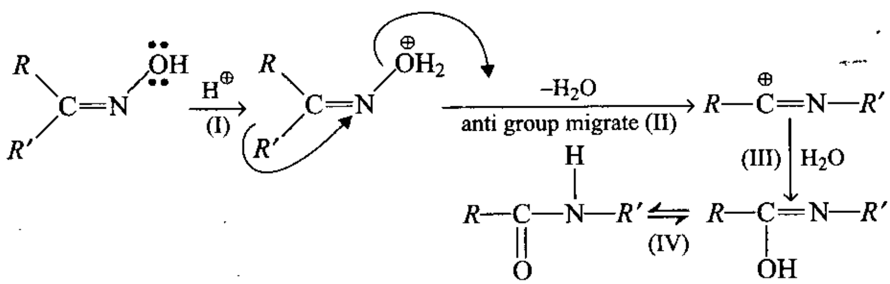
Passage-2

Ketoxime when heated with certain reagents undergoes rearrangement to form amides. This is known as Beckmann's rearrangement.



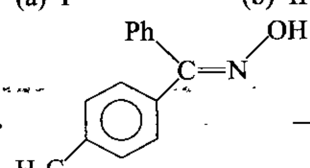
N-Substituted amide

Mechanism :

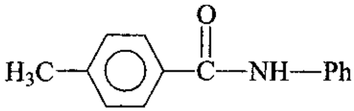


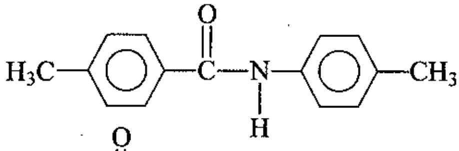
4. Find out slowest step of the reaction :

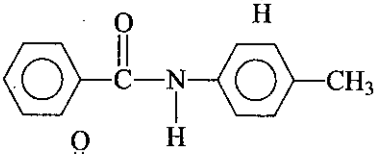
(a) I (b) II (c) III (d) IV

5.  $\xrightarrow{PCl_5}$ (X)

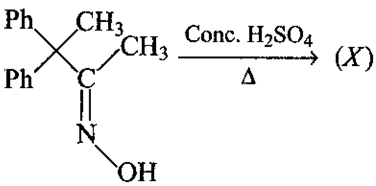
Find out (X) :

(a) 

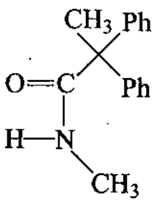
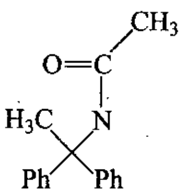
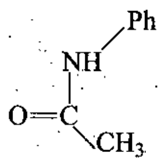
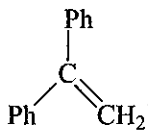
(b) 

(c) 

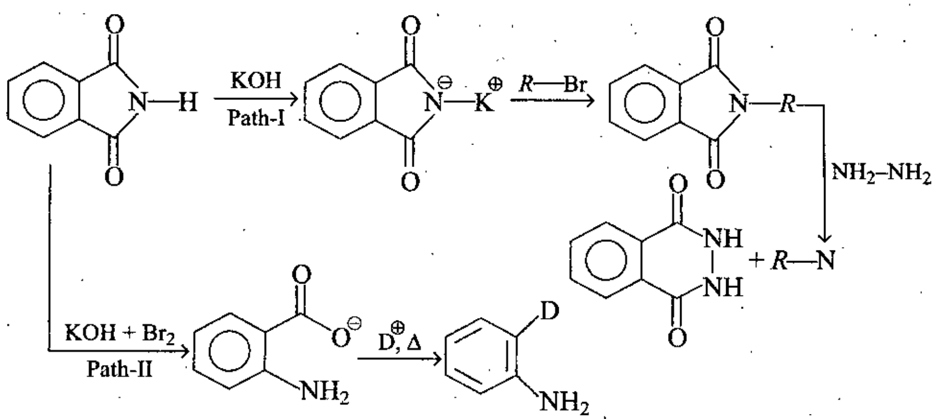
(d) $Ph-\overset{\overset{O}{\|}}{C}-NH-Ph$

6. 

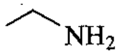
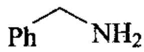
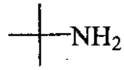
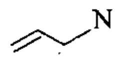
Find out (X) of the reaction :

(a)  (b)  (c)  (d) 

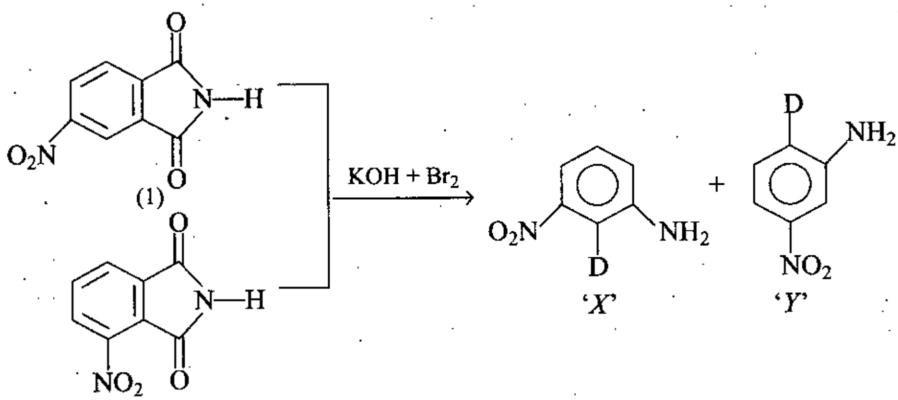
Passage-3



7. Which of the following amines cannot be prepared by path-I?

(a)  (b)  (c)  (d) 

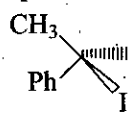
8. Consider path II, choose the major product for 1 and 2 :

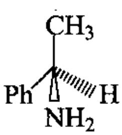
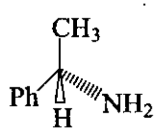


(1) (2) 'X' 'Y'

(a) $1-Y, 2-X$ (b) $1-X, 2-Y$ (c) $1-X, 2-X$ (d) $1-Y, 2-Y$

9. In the path I, if

$R =$ , then the amine finally formed is :

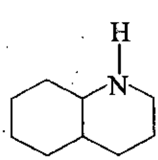
(a)  (b) 

(c) racemic mixture of a and b (d) none of these

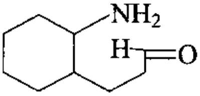
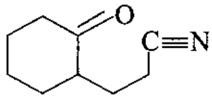
Passage-4

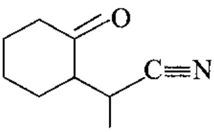
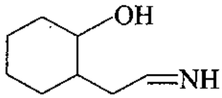
An organic compound 'A' has molecular formula $C_9H_{13}NO$ and it can be resolved into enantiomers. A does not decolourise bromine water solution. A on refluxing with dilute H_2SO_4 yields another resolvable compound B ($C_9H_{14}O_3$) which gives effervescence with $NaHCO_3$. B on treatment with $NaBH_4$ yields C ($C_9H_{16}O_3$) on heating with concentrated H_2SO_4 yields ester D ($C_9H_{14}O_2$).

Compound A on reduction with $LiAlH_4$, followed by treatment of H_2SO_4 yields following compound :

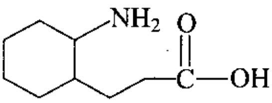
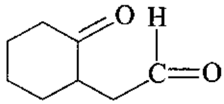


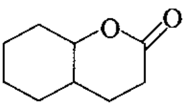
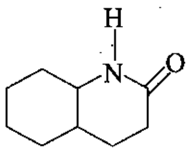
10. Find out structure of compound '*A*' :

(a) 
(b) 

(c) 
(d) 

11. The sweet smelling neutral compound *D* is :

(a) 
(b) 

(c) 
(d) 

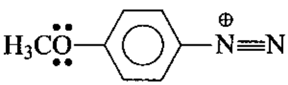
12. Due to reduction of optically pure '*B*' two isomeric product '*C*' form. Isomeric product '*C*' are :

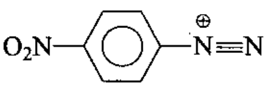
(a) Enantiomers
(b) Diastereomers
(c) Position isomers
(d) Functional isomers

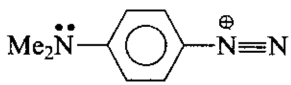
Passage-5

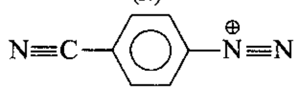
When an primary aromatic amine is treated with $NaNO_2 + HCl$ at $0° - 5°C$, a diazonium salt is formed and the reaction is called diazo reaction. In this reaction mineral acid must be added to prevent the coupling reaction of diazonium salt with excess of aryl amine. Diazonium salt is highly useful in the synthesis of number of coloured dyes.

13. For the following diazonium ion the decreasing order of reactivity of these ion in azo-coupling reaction :


(*P*)

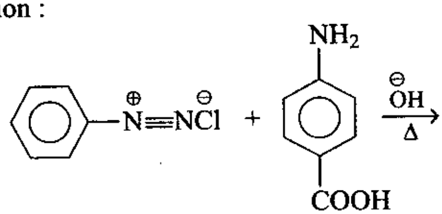

(*Q*)


(*R*)

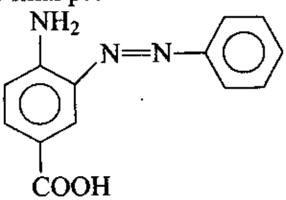

(*S*)

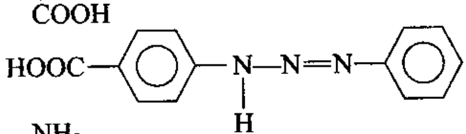
(a) $Q > S > R > P$
(b) $Q > S > P > R$
(c) $P > Q > R > S$
(d) $S > R > Q > P$

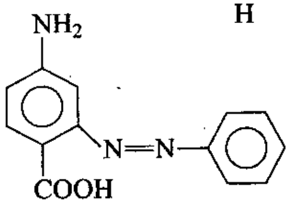
14. In the given reaction :

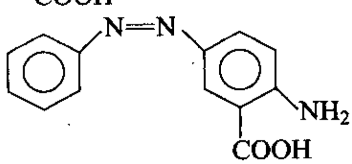


The final product is

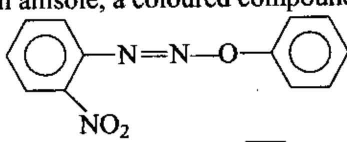
(a) 

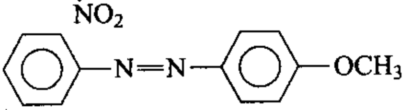
(b) 

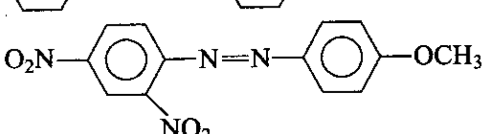
(c) 

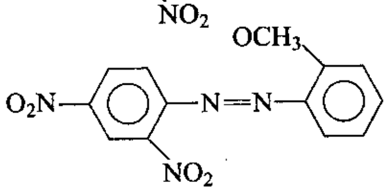
(d) 

15. When 2, 4-dinitrophenol react with $NaNO_2 + HCl$ at 5°C followed by reaction with anisole, a coloured compound is formed which can be given as :

(a) 

(b) 

(c) 

(d) 

EXERCISE-4 MATRIX MATCH TYPE

1. **Column (I)** | **Column (II)**

(a) $Ph-CH_2-CH_2-\overset{\oplus}{N}(CH_2Ph)(CH_3)-CH_2CH_3 \xrightarrow[\Delta]{\overset{\ominus}{O}H}$ | *P.* Gives pungent smell on treatment with $CHCl_3, \overset{\ominus}{O}H$

(b) $CH_3CH_2-C(CH_3)(OH)-CH_3 \xrightarrow[H^{\oplus}]{NaCN}$ | *Q.* 3° amine

(c) $CH_3CH_2-NO_2 \xrightarrow{Zn/NH_4Cl}$ | *R.* Gives positive Tollen's test

(d) $Ph-CH_2-CH_2-\overset{\oplus}{N}(CH_2CH_3)(\overset{\ominus}{O})-CH_2Ph \xrightarrow{\Delta}$ | *S.* The amine which is not prepared by Hofmann ammonolysis process

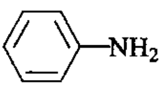
T. Hydroxyl amine

2. **Column (I)** | **Column (II)**

(a) $CH_3CH_2CH_2NH_2$ | *P.* Treatment of $NaNO_2$, HCl gives N-nitroso compound

(b) $CH_3CH_2-N(H)-CH_3$ | *Q.* Treatment of $NaNO_2$, HCl gives diazoniumchloride

(c) $CH_3-N(CH_3)-CH_3$ | *R.* Treatment of excess CH_3I followed by AgOH and heat gives out alkene

(d)  | S. Treatment of HCl, Δ gives dealkylation

3. **Column (I)** | **Column (II)**

(a) Hofmann degradation | *P.* Aldehyde + 1° amine

(b) Curtius rearrangement | *Q.* Isocyanate

(c) Lossen rearrangement | *R.* Br_2 + KOH

(d) Hemiaminal | *S.* $R-\overset{O}{\overset{\|}{C}}-N=\overset{\oplus}{N}=\overset{\ominus}{N}$

4. **Column (I)** | **Column (II)**

(a) $H_3C-\overset{\overset{\displaystyle CH_3}{|}}{C}H-OH$

(b) $H_3C-\overset{\overset{\displaystyle O}{||}}{C}-NH_2$

(c) $H_3C-N=C=O$

(d) $R-\overset{\oplus}{N}\equiv\overset{\ominus}{C}$

P. Hydrolysis gives 1° amine

Q. Reduction gives 2° amine

R. $Br_2, \overset{\ominus}{O}H$, gives bromoform

S. NaOBr gives 1° amine

T. Dehydration gives nitrile

5. **Column (I)** | **Column (II)**

(a) $R-\overset{\overset{\displaystyle O}{||}}{C}-NH_2 \longrightarrow R-CH_2NH_2$

(b) $R-\overset{\overset{\displaystyle O}{||}}{C}-NH_2 \longrightarrow R-NH_2$

(c) $R-\overset{\overset{\displaystyle O}{||}}{C}-NH_2 \longrightarrow R-CN$

(d) $R-\overset{\overset{\displaystyle O}{||}}{C}-N_3 \longrightarrow RNH_2$

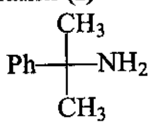
P. Schmidt reaction

Q. P_2O_5

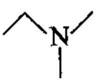
R. Hofmann reaction

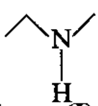
S. $LiAlH_4$

6. **Column (I)** | **Column (II)**

(a) 

(b) 

(c) 

(d) 

P. Treatment of CS_2, $HgCl_2$ gives out alkyl isothiocyanate

Q. Treatment of $Ph-SO_2-Cl$ produces the compound insoluble in alkali

R. Treatment of H_2O_2, Δ gives out alkene

S. Treatment of CS_2 produces dithio carbamic acid

7. **Column (I)**
(Amines)

(a) $C_2H_5NH_2$ and $C_6H_5NH_2$

(b) $(C_2H_5)_3N$ and $(C_2H_5)_2NH$

(c) $C_2H_5NH_2$ and $(C_2H_5)_3N$

(d) $(C_2H_5)_3N$ and $C_6H_5NH_2$

Column (II)
(Distinguished by)

P. Carbylamine test

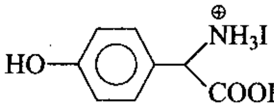
Q. Azo dye test

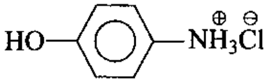
R. Hinsberg reagents

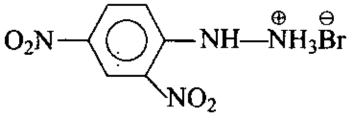
S. Liebermann nitroso reaction

8. Column (I) | **Column (II)**

(a) $H_2N-\overset{\oplus}{N}H_3\overset{\ominus}{Cl}$

(b) 

(c) 

(d) 

P. Na extract of compound gives prussian blue colour with $FeSO_4$

Q. Positive $FeCl_3$ test

R. White ppt. with $AgNO_3$

S. react with aldehyde to form the corresponding hydrazone derivative

9. Column (I) | **Column (II)**

(a) $C_2H_5-NH_2$

(b) $(C_2H_5)_2NH$

(c) $(C_2H_5)_3N$

(d) $C_6H_5NH_2$

P. Reaction with $NaNO_2$ + HCl

Q. Reaction with $CHCl_3$ + KOH

R. Formation of N-nitrosodiethyl amine with HNO_2

S. Formation of triethyl ammonium nitroso with HNO_2

EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

1. Find out number of reactions which involve electron deficient nitrogen during reaction mechanism.

(a) $\underset{Ph}{\overset{H_3C}{>}}C=N\backslash OH \xrightarrow{\text{Dilute. } H_2SO_4}$

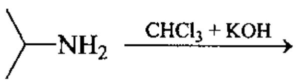
(b) $H_3C-\overset{O}{\overset{\|}{C}}-Ph \xrightarrow{PhCO_3H}$

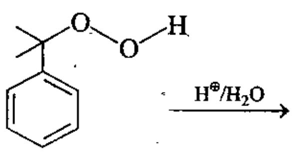
(c) $CH_3-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{Br_2 + KOH}$

(d) $CH_3-\overset{O}{\overset{\|}{C}}-OH \xrightarrow[3.\ Ag_2O/H_2O]{1.\ SOCl_2,\ 2.\ CH_2N_2}$

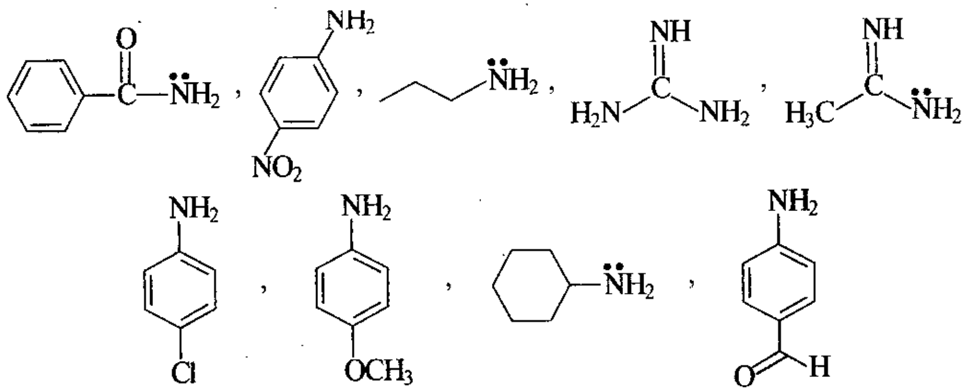
(e) $Ph-\overset{O}{\overset{\|}{C}}-OH \xrightarrow{N_3H,\ \text{Dilute } H_2SO_4}$

(f) $CH_3-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[H_2O,\ D]{NaN_3}$

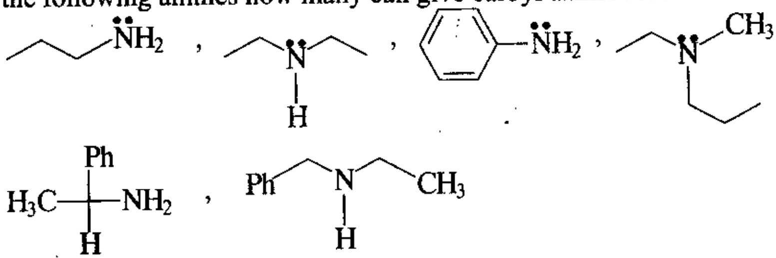
(g) 

(h) 

2. Examine the structural formulas of following compounds and identify how many compounds are more basic than aniline.



3. Of the following amines how many can give carbyl amine reaction.



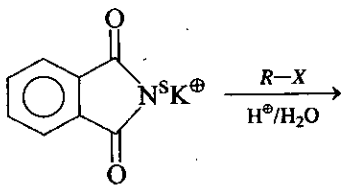
4. Of the following reactions, how many reaction, are used for the preparation of amines.

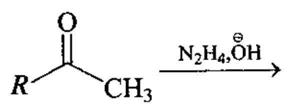
(a) $R—C \equiv N \xrightarrow{LiAlH_4}$

(b) $R—\overset{\overset{O}{\|}}{C}—NH_2 \xrightarrow{LiAlH_4}$

(c) $R—\overset{\overset{O}{\|}}{C}—NH_2 \xrightarrow{Br_2 + \overset{\ominus}{O}H}$

(d) $R—\overset{\overset{O}{\|}}{C}—CH_3 + H_3C—NO_2 \xrightarrow{NaOH}$

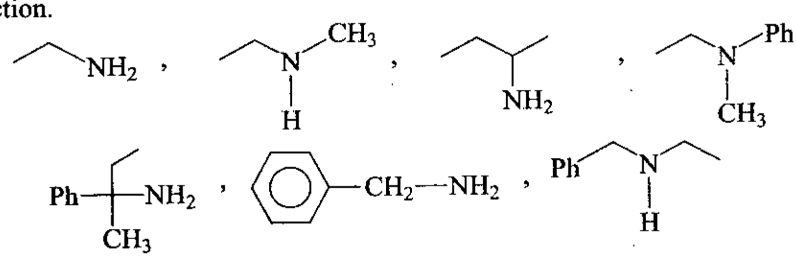
(e) 

(f) 

(g) $R—\overset{\overset{O}{\|}}{C}—NH_2 \xrightarrow[D]{P_2O_5}$

(h) $R—CH_2—NO_2 \xrightarrow{H_2, Ni}$

5. Of the following amines how many can be seperated by Hoffmann's mustard oil reaction.



ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (c)	2. (c)	3. (d)	4. (b)	5. (a)	6. (c)	7. (c)	8. (c)	9. (b)	10. (b)
11. (c)	12. (a)	13. (a)	14. (b)	15. (b)	16. (c)	17. (b)	18. (b)	19. (b)	20. (c)
21. (c)	22. (b)	23. (a)	24. (b)	25. (d)	26. (c)	27. (a,b,c)	28. (d)	29. (c)	30. (d)
31. (d)	32. (b)	33. (c)	34. (c)	35. (b)	36. (b)	37. (b,d)	38. (a,b)	39. (d)	40. (a)
41. (c)									

Level-2

1. (c)	2. (d)	3. (d)	4. (b)	5. (a)	6. (c)	7. (a)	8. (a)	9. (b)	10. (c)
11. (c)	12. (a)	13. (b)	14. (a)	15. (c)	16. (d)	17. (c)	18. (d)	19. (b)	20. (a)
21. (a)	22. (c)	23. (c)	24. (b)	25. (d)	26. (b)	27. (c)	28. (d)	29. (a)	30. (c)
31. (a)	32. (a)	33. (d)	34. (c)	35. (b)	36. (d)	37. (a)	38. (b)	39. (b)	40. (d)
41. (a)	42. (b)	43. (c)	44. (d)	45. (c)	46. (c)	47. (b)	48. (d)	49. (a)	50. (c)
51. (d)	52. (a)	53. (b)	54. (c)	55. (a)	56. (d)	57. (b)	58. (c)	59. (b)	60. (a)
61. (b)	62. (d)	63. (b)	64. (c)	65. (b)	66. (b)	67. (c)	68. (a)	69. (c)	70. (a)
71. (c)	72. (a)	73. (d)	74. (d)	75. (a)	76. (c)	77. (b)	78. (d)	79. (b)	80. (b)
81. (b)	82. (d)	83. (b)	84. (a)	85. (c)	86. (b)	87. (c)	88. (c)	89. (b)	

Exercise-2 : More Than One Correct Answers

1. (a, b, c)	2. (a, b, c)	3. (a, c, d)	4. (b, c, d)	5. (a, b, d)	6. (b, c)
7. (b, c, d)	8. (a, b, c)	9. (a, b, c)	10. (a, c)	11. (a, b, c)	12. (a, b, c)
13. (a, b, c)	14. (a, c, d)	15. (a, b, c)	16. (a, b, c)	17. (a, c, d)	18. (a, b)
19. (a, b, c, d)	20. (a, c)	21. (a, b)	22. (a, b, c)	23. (a, c)	24. (a, b, c)
25. (a, b, c, d)	26. (a, c)	27. (a, b)			

Exercise-3 : Linked Comprehension Type

1. (d)	2. (b)	3. (a)	4. (b)	5. (c)	6. (d)	7. (c)	8. (a)	9. (b)	10. (b)
11. (c)	12. (b)	13. (b)	14. (a)	15. (c)					

Exercise-4 : Matrix Match Type

1. (a) → Q;	(b) → P, R, S;	(c) → R, T;	(d) → T
2. (a) → R, S;	(b) → P, R, S;	(c) → S;	(d) → Q
3. (a) → Q, R;	(b) → Q, S;	(c) → Q;	(d) → P
4. (a) → R;	(b) → S, T;	(c) → P, Q, S;	(d) → P, Q, S
5. (a) → S;	(b) → R;	(c) → Q;	(d) → P
6. (a) → P, S;	(b) → P, S;	(c) → R;	(d) → Q, S
7. (a) → Q;	(b) → R, S;	(c) → P, R;	(d) → P, Q, R
8. (a) → R, S	(b) → P, Q	(c) → P, Q	(d) → P, S
9. (a) → P, Q	(b) → P, R	(c) → P, S	(d) → P, Q

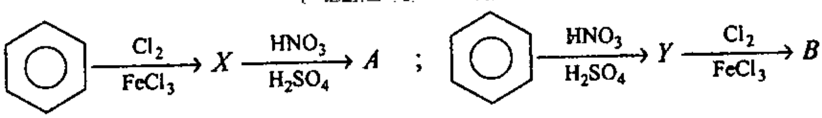
Exercise-5 : Integer Answer Type Problems

1. (4)	2. (5)	3. (3)	4. (5)	5. (4)

9 Aromatic Hydrocarbons

EXERCISE-1 ONLY ONE CORRECT ANSWER

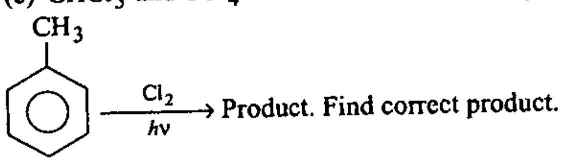
LEVEL-1

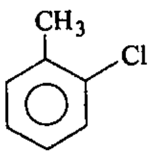
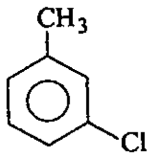
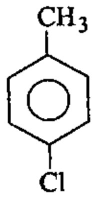
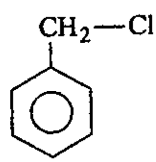
1. 

A and B are :
(a) identical
(b) position isomers
(c) geometrical isomers
(d) none of these

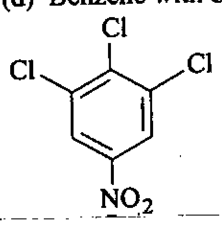
2. Benzene reacts with Cl_2 in the presence of $FeCl_3$ and in absence of sunlight to form :
(a) benzyl chloride
(b) benzal chloride
(c) chlorobenzene
(d) benzenehexa chloride

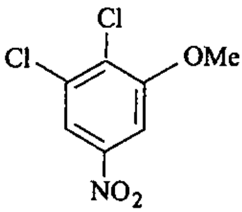
3. Phenol gives Reimer Tiemann reaction with :
(a) $CHCl_3$
(b) CCl_4
(c) $CHCl_3$ and CCl_4
(d) C_6H_5CHCl

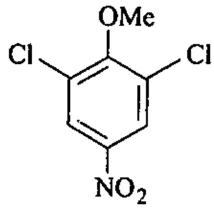
4. 

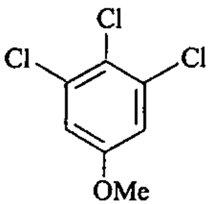
(a) 
(b) 
(c) 
(d) 

5. Benzyl chloride can be prepared by reacting :
(a) Toluene with Cl_2 in the presence of $FeCl_3$
(b) Benzene with CH_3Cl in the presence of $AlCl_3$
(c) Toluene with Cl_2 in the presence of sunlight
(d) Benzene with Cl_2 in the presence of $FeCl_3$

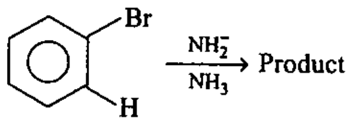
6.  $+ \underset{(1\ \text{mole})}{CH_3ONa} \longrightarrow P$ (major); P is :

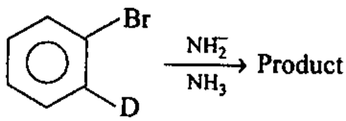
(a) 

(b) 

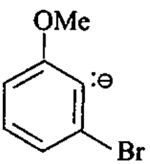
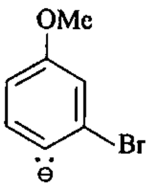
(c) 

(d) None of these

7. (I) 

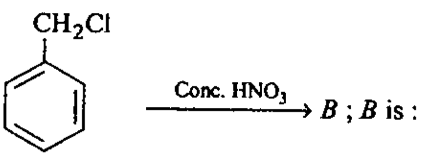
(II) 

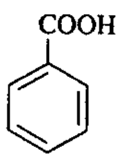
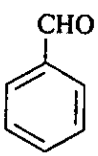
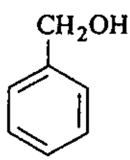
(a) II is more reactive than I.
(b) I is more reactive than II
(c) Both have same reactivity.
(d) None of these

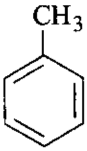
8.  

(I) (II)

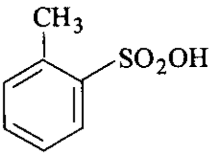
(a) (I) is more stable than (II)
(b) (II) is more stable than (I)
(c) (I) and (II) have same stability
(d) None of these

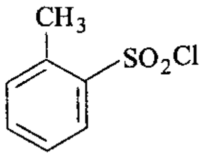
9. 

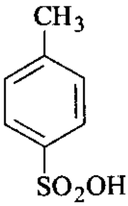
(a) 
(b) 
(c) 
(d) All of these

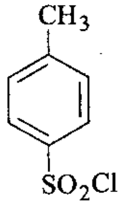
10.  $\xrightarrow{ClSO_2OH}$ P (Major product)

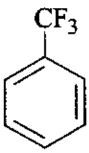
P is :

(a) 

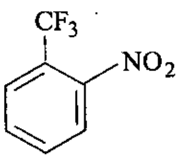
(b) 

(c) 

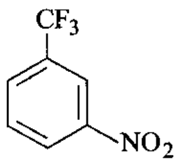
(d) 

11.  $\xrightarrow[H_2SO_4]{HNO_3}$ A (Major product)

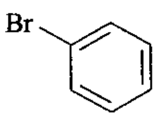
A is :

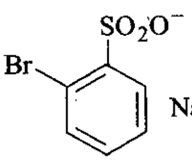
(a) 

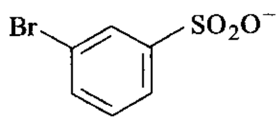
(b) 

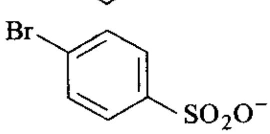
(c) 

(d) All of these

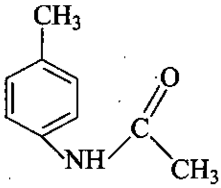
12.  $\xrightarrow[\text{(ii) NaOH}]{\text{(i) } SO_3 + H_2SO_4}$ P (68% yield) : P is :

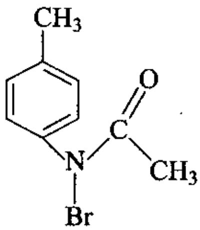
(a)  Na^+

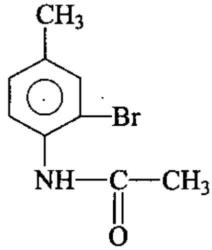
(b)  Na^+

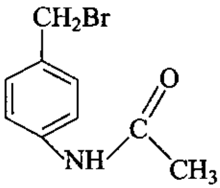
(c)  Na^+

(d) None of these

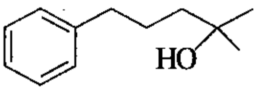
13.  $\xrightarrow{Br_2} P$; P is :

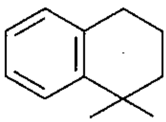
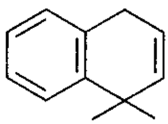
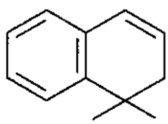
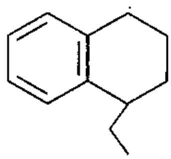
(a) 

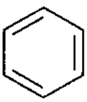
(b) 

(c) 

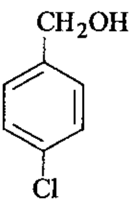
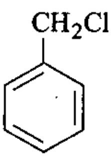
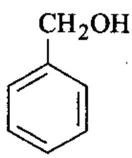
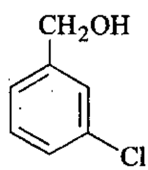
(d) None of these

14.  $\xrightarrow{H^+} B$; B is :

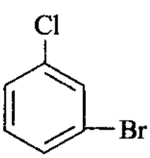
(a)  (b)  (c)  (d) 

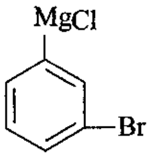
15.  $+ HCHO \xrightarrow{HCl} (A)$ (Final product)

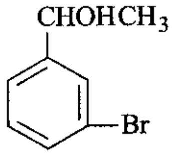
A is :

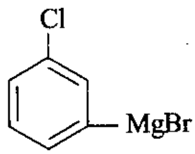
(a)  (b)  (c)  (d) 

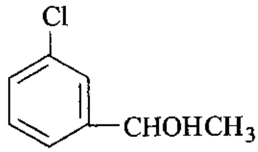
16. What are A and B in the following reaction ?

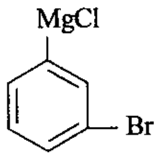
 $\xrightarrow{Mg/THF} A \xrightarrow[\text{(ii) aq. } NH_4Cl]{\text{(i) } CH_3CHO} B$

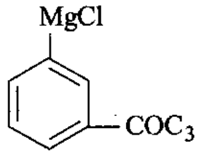
(a) 

and 

(b) 

and 

(c) 

and 

(d) None of these

17. When phenol reacts with bromine in CS_2 at a low temperature, the product is :
(a) m - bromophenol (b) p - bromophenol
(c) o - and p - bromophenol (d) 2, 4, 6-tribromophenol

18. Phenol reacts with conc. HNO_3 in the presence of conc. H_2SO_4 to give :
(a) *meta* nitrophenol (b) *ortho* nitrophenol
(c) *ortho* and *para* nitrophenol (d) picric acid

19. Phenol on heating with $NaNO_2$ and a few drops of conc. H_2SO_4 gives :
(a) p - Nitrophenol (b) p - Nitrosophenol
(c) o - Nitrophenol (d) m - Nitrosophenol

20. In Liebermann nitroso test:
(a) phenol reacts with nitroso acid
(b) aniline reacts with nitrous acid
(c) phenol and aniline reacts with $NaNO_2$ + HCl
(d) none of the above

21. Kolbe's reaction consists in obtaining :
(a) anisol from phenol
(b) salicylaldehyde from phenol and CHI_3
(c) salicylic acid from sodium phenate and CO_2
(d) salicylic acid from phenol and CO_2

22. Which derivative of phenol gives effervescence with $NaHCO_3$?
(a) o - Cresol (b) Catechol
(c) 2, 4, 6-Trinitrophenol (d) 2, 4, 6-Tribromophenol

23. Phenol and benzoic acid can be distinguished by:
(a) aqueous $NaHCO_3$ (b) aqueous $NaNO_3$
(c) aqueous NaOH (d) conc. H_2SO_4

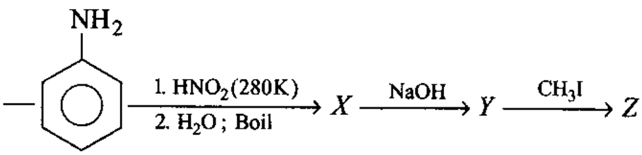
24. Phenol and cyclohexanol can be distinguished by using :
(a) $FeCl_3$ (b) Na (c) PCl_3 (d) CH_3COCl

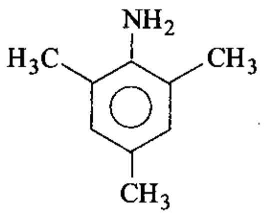
25. The compound which will readily couple with benzene diazonium chloride is :
(a) benzoic acid (b) phenol (c) benzene (d) benzaldehyde

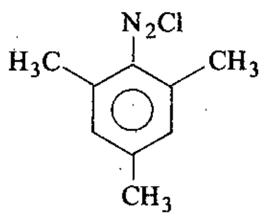
26. Phenol can be converted into salicylic acid by heating with :
(a) CO_2 (under pressure) and alkali
(b) CCl_4 and alkali
(c) $CHCl_3$ and alkali, followed by oxidation
(d) all of the above

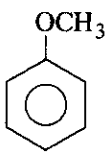
27. In chlorobenzene, the —Cl group:
(a) activates the benzene ring more, via resonance effect than deactivating it via inductive effect
(b) deactivates the benzene ring more, via inductive effect than activating it via resonance effect
(c) activates the benzene ring via resonance effect and deactivates it via inductive effect. Both these effect are evenly matched.
(d) it is a net deactivating group with director characteristics

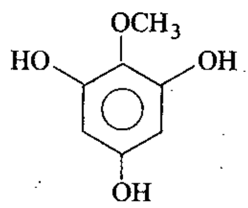
28. Identify 'Z' in the reaction given below :



(a) 

(b) 

(c) 

(d) 

29. Rate of substitution reaction in phenol is :
(a) slower than the rate of benzene (b) faster than the rate of benzene
(c) equal to the rate of benzene (d) none of these

30. Identify (A), (B) and (C) in the following reaction sequence.

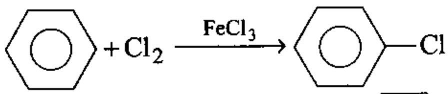
$$C_6H_5OH \xrightarrow{(A)} C_6H_6 \xrightarrow{(B)} C_6H_5NO_2 \xrightarrow{(C)} \text{Azobenzene}$$

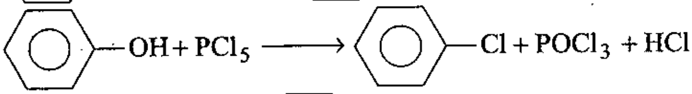
(a) $(A) = NaOH + CaO, (B) = \text{conc.} H_2SO_4 + \text{conc. } HNO_3, 60\text{-}70°C, (C) = \text{glucose} + NaOH$
(b) (A)=Zn power, $(B) = \text{conc.} H_2SO_4 + \text{conc. } HNO_3, 100°C, (C) = NH_4Cl + Zn$

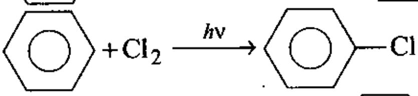
(c) $(A) = Zn$, $(B) =$ conc. H_2SO_4 + conc. HNO_3, 60 - 70°C $(C) = Zn + NaOH$

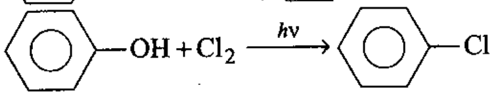
(d) $(A) = NaOH + CaO$, $(B) =$ conc. HNO_3 + conc. H_2SO_4, Reflux 24 hrs. $(C) = CH_3OH + Na$

31. The best method for the preparation of chlorobenzene is :

(a) 

(b) 

(c) 

(d) 

32. Which of the following reaction is called 'Schotten-Baumann' reaction ?

(a) $C_6H_6 \xrightarrow{AlCl_3/CH_3COCl} C_6H_5COCH_3$

(b) $C_6H_5NH_2 \xrightarrow{CH_3COCl} C_6H_5NHCOCH_3$

(c) $C_6H_5OH \xrightarrow{C_6H_5COCl} C_6H_5OCOC_6H_5$

(d) $C_6H_6 \xrightarrow[C_6H_5COCl]{AlCl_3} C_6H_5COC_6H_5$

33. Which of the following is nor correctly matched ?

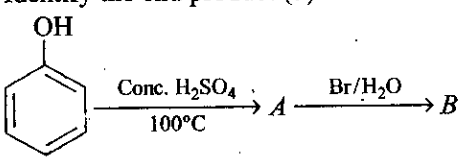
(a) Phenol + $CHCl_3$ + NaOH $\xrightarrow{\text{Heat}}$ Salicylaldehyde

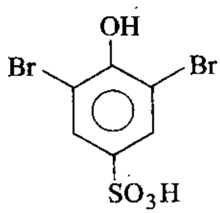
(b) Phenol + Phthalic anhydride $\xrightarrow[H_2SO_4]{\text{Heat}}$ Phenetole

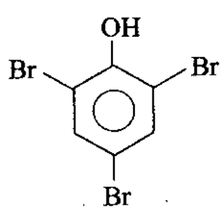
(c) Phenol $\xrightarrow[H_2SO_4]{Br_2 \text{ water}}$ Tribromophenol

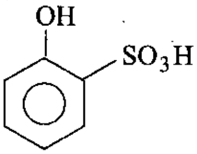
(d) Sodium phenate + CO_2 $\xrightarrow{\text{Heat, Pressure}}$ Salicylic acid

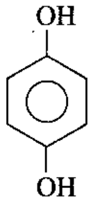
34. Identify the end product (b) of the following sequence of reaction.



(a) 

(b) 

(c) 

(d) 

35. Benzene can be obtained by :

(a) $C_6H_5OH + NaOH \xrightarrow[\Delta]{CuO}$ (b) $C_6H_5OH + Zn \xrightarrow{\Delta}$

(c) $C_6H_5—N{=}N—Cl + H_2O \longrightarrow$ (d) All of these

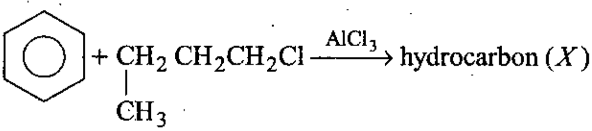
36. Point out incorrect statement about resonance.

(a) Resonance structure should have equal energy.

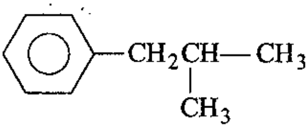
(b) In resonance structures, the constituent atom should be in the same position.

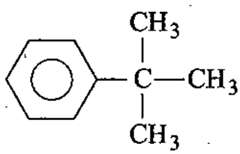
(c) In resonance structure there should be the same number of electron pairs.

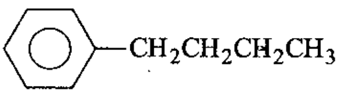
(d) Resonance structures should differ only in the location of electrons around the constituent atoms.

37. 

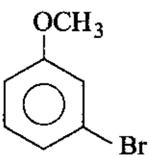
The major product X is :

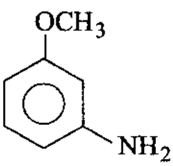
(a) 

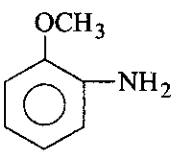
(b) 

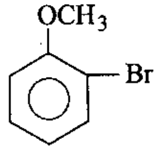
(c) 

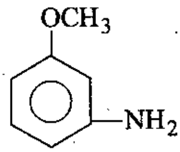
(d) none is correct

38.  $\xrightarrow{Na\overset{\oplus}{N}H_2}$ A, major product A and reaction R are :

(a)  , elimination addition

(b)  , elimination addition

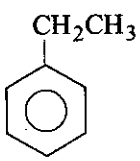
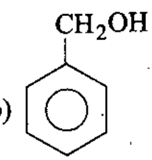
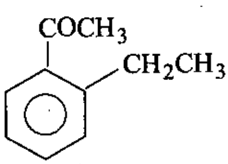
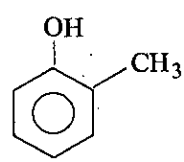
(c)  , cine substitution

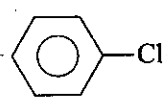
(d)  , addition elimination

39. In the sulphonation, acetylation and formylation of benzene the group of effective electrophiles would be ?

(a) $SO_3^{+}, CH_3C\equiv\overset{+}{O}, H\overset{+}{C}O$
(b) $SO_3, CH_3-C\equiv\overset{+}{O}, H\overset{+}{C}O$
(c) $SO_3, CH_3CHO, CO + HCl$
(d) HSO_3, CH_3CO, HCO

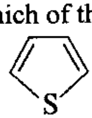
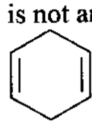
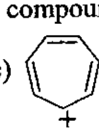
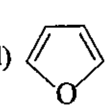
40. Benzoic acid may be prepared by the oxidation of :

(a) 
(b) 
(c) 
(d) 

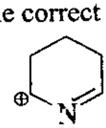
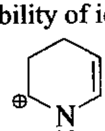
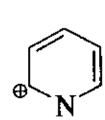
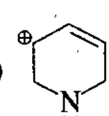
41. Chloral +  $\xrightarrow{\text{Conc. } H_2SO_4}$ product. The product is :

(a) lindane
(b) DDT
(c) tefflon
(d) ethaneperchlorate

42. Which of the following is not an aromatic compound ?

(a) 
(b) 
(c) 
(d) 

43. The correct order of stability of ions is :

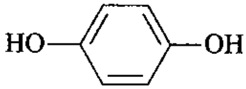
(I) 
(II) 
(III) 
(IV) 

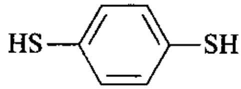
(a) I < IV < II < III
(b) III < II < IV < I
(c) IV < I < II < III
(d) none of these

44. Number of π electrons present in naphthalene is :

(a) 2
(b) 4
(c) 10
(d) 14

45. Dipole moment of which compound will be zero ?

(a) 

(b) 

(c) 

(d) All of these

46. $X \xrightarrow{Cl_2}$ Benzotrichloride $\xrightarrow{\text{Hydrolysis}} Y$. What are X and Y respectively ?

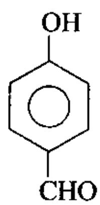
(a) Benzene, Benzaldehyde
(b) Toluene, Benzaldehyde
(c) Toluene, Benzoic acid
(d) Benzene, Benzoic acid

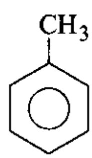
47. Which of the following reactions is not an example of electrophilic substitution ?

(a) $C_6H_6 + {}^{+}NO_2 \longrightarrow C_6H_5NO_2 + H^+$

(b) $C_6H_5 + CH_3Cl \xrightarrow{AlCl_3} C_6H_5—CH_3 + HCl$

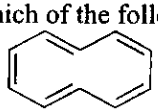
(c) $C_6H_6 + Cl_2 \xrightarrow{\text{UV light}} C_6H_6Cl_6$

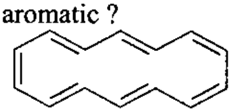
(d) $C_6H_5OH + CO + HCl \xrightarrow[AlCl_3]{\text{Anhy.}}$ 

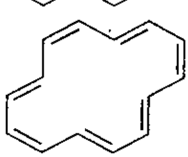
48. Major product of this reaction will be :  $\xrightarrow[AlCl_3, \Delta]{CH_3Cl}$

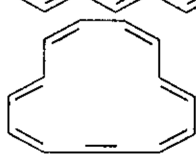
(a) o-xylene
(b) p-xylene
(c) both
(d) m-xylene

49. Which of the following may best be called aromatic ?

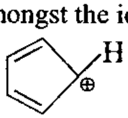
(a) 

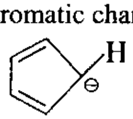
(b) 

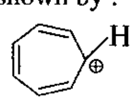
(c) 

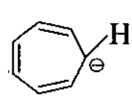
(d) 

50. Amongst the ions, the aromatic character is shown by :

(I) 

(II) 

(III) 

(IV) 

(a) I and III
(b) II and IV
(c) II and III
(d) I, II, III and IV

LEVEL-2

1. The carbon atoms of benzene are :

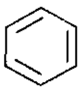
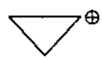
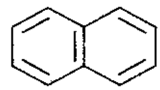
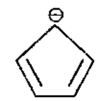
(a) sp^2-hybridised (b) sp-hybridised

(c) sp^3-hybridised (d) Non-hybridised

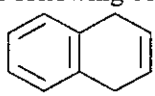
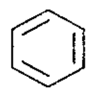
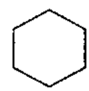
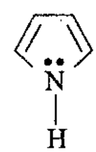
2. The C—C bond order in benzene is :

(a) 1 (b) 2 (c) 1.5 (d) 1.3

3. Which of the following compounds is non aromatic?

(a)  (b)  (c)  (d) 

4. Which of the following compounds will show aromatic character?

I II III IV

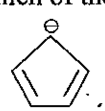
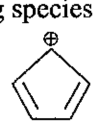
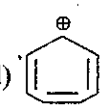
(a) II and IV (b) I, II and IV (c) II and III (d) I and II

5. A molecule of benzene has :

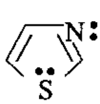
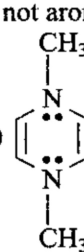
(a) 6σ and 9π bonds (b) 9σ and 3π bonds

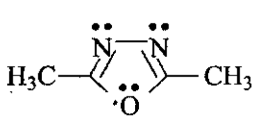
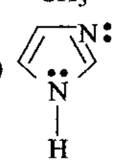
(c) 12σ and 3π bonds (d) 6σ and 3π bonds

6. Which of the following species is not aromatic?

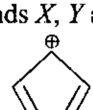
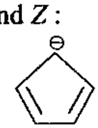
(a)  (b)  (c)  (d) 

7. Which one of the following compounds is not aromatic?

(a)  (b) 

(c)  (d) 

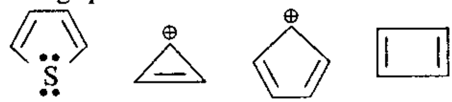
8. The order of stability of compounds X, Y and Z :

X Y Z

(a) $X > Y > Z$ (b) $Y > Z > X$ (c) $Z > X > Y$ (d) $X > Z > Y$

9. Which of the following species are antiaromatic?



I II III IV

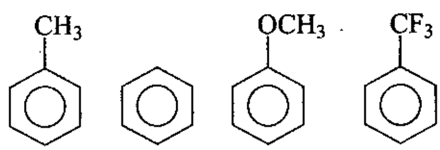
(a) III and IV (b) I and III (c) I and II (d) I and IV

10. When sodium benzoate is heated with soda lime, the product formed is :
   (a) phenol (b) chlorobenzene
   (c) benzene (d) benzaldehyde

11. Among the following compounds that can be most readily nitrated is :
   (a) benzene (b) benzaldehyde
   (c) toluene (d) chlorobenzene

12. Which of the following compounds is most readily nitrated is?
   (a) benzene (b) phenol
   (c) toluene (d) nitrobenzene

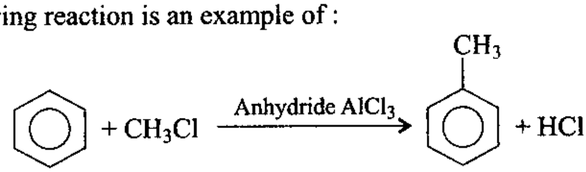
13. Among the compounds the order of decreasing reactivity towards electrophilic substitution is :



I II III IV

   (a) II > I > III > IV (b) III > I > II > IV
   (c) III > I > IV > II (d) II > I > IV > III

14. The following reaction is an example of :



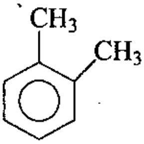
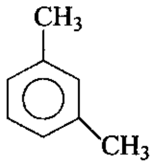
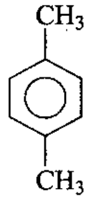
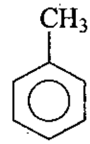
   (a) Wurtz reaction (b) Kolbe electrolysis
   (c) Friedel-Crafts reaction (d) Grignard synthesis

15. The function of anhydrous $AlCl_3$ in Friedel-Crafts reaction is to :
   (a) absorb water (b) produce a nucleophile
   (c) produce an electrophile (d) absorb HCl

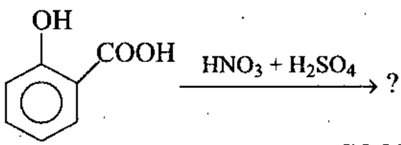
16. The presence of which one of the following groups on benzene nucleus activate it towards electrophilic substitution :

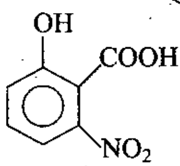
   (a) $-C\equiv N$ (b) $-\overset{\overset{\displaystyle O}{\|}}{C}-H$ (c) $-\overset{\overset{\displaystyle O}{\|}}{C}-OR$ (d) $-O-\overset{\overset{\displaystyle O}{\|}}{C}-R$

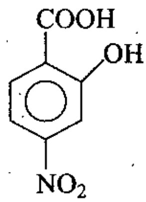
17. Which one of the following compounds give only one isomer upon nitration?

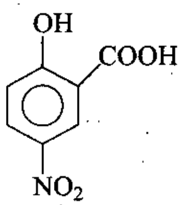
(a)  (b)  (c)  (d) 

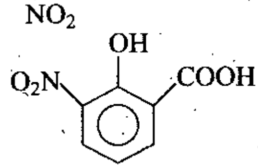
18. In the given reaction



(a) 

(b) 

(c) 

(d) 

19. Which one of the following aromatic compounds fails to undergo Friedel-Crafts reactions?

(a) $C_6H_5—CH_3$ (b) C_6D_6 (c) $C_6H_5—NO_2$ (d) C_6H_5Cl

20. The reaction least likely to occur is :

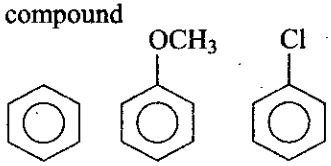
(a) $C_6H_6 + HNO_3 \xrightarrow{H_2SO_4} C_6H_5NO_2$

(b) $C_6H_6 + H_2SO_4 \longrightarrow C_6H_5SO_3H$

(c) $C_6H_6 + Br_2 \xrightarrow{Fe} C_6H_5Br$

(d) $C_6H_6 + Cl_2 \xrightarrow[\text{light}]{UV} C_6H_5Cl$

21. Consider the following compound



I II III

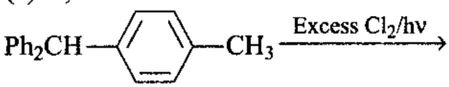
The relative reactivity towards halonium ion is such that :

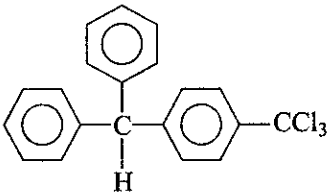
(a) I > II > III (b) II > I > III (c) II > III > I (d) III > I > II

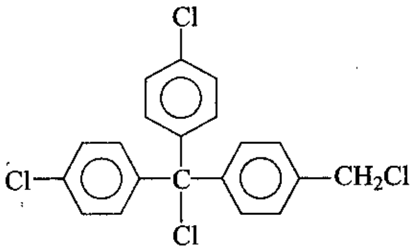
22. In the given reaction, $C_6H_5{-}NH_2 \xrightarrow[\text{Pyridine}]{Ac_2O} X \xrightarrow[FeCl_3]{Cl_2} Y \xrightarrow{H_2O} Z$.

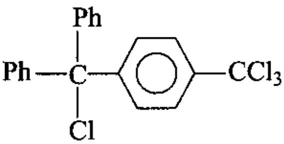
The product Z will be :

(a) *o*-chloroaniline
(b) mixture of *o*- and *p*-chloroaniline
(c) 2, 4-dichloroaniline
(d) 2, 4, 6-trichloroaniline

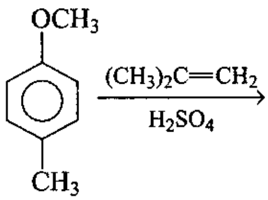
23.  gives :

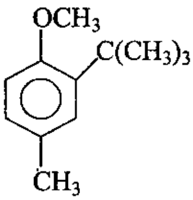
(a) 

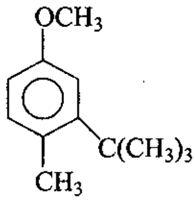
(b) 

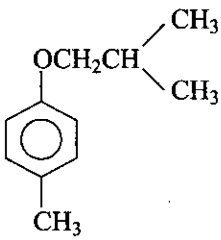
(c) 

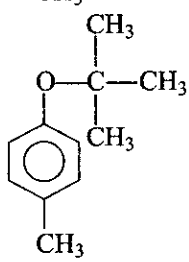
(d) None of these

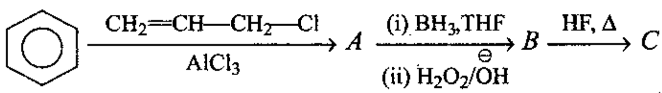
24.  gives :

(a) 

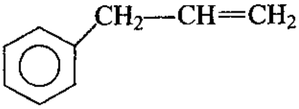
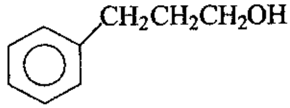
(b) 

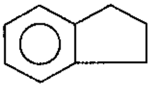
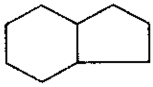
(c) 

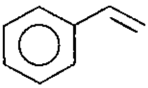
(d) 

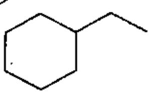
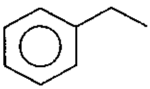
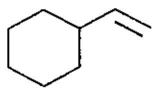
25. 

compound C will be :

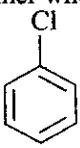
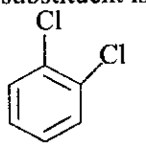
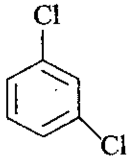
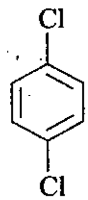
(a) 
(b) 

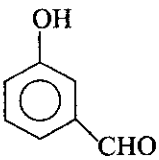
(c) 
(d) 

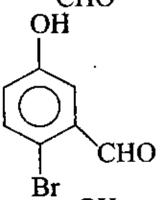
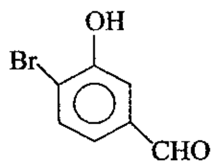
26.  $\xrightarrow[100°C]{H_2\text{ (1 atm), Pd}}$ A ; Product A in the reaction is :

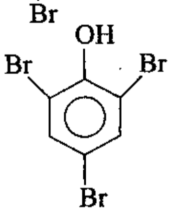
(a) 
(b) 
(c) 
(d) all of these

27. Which of the following substituted benzene derivatives would furnish three isomer when one more substituent is introduced?

(a) 
(b) 
(c) 
(d) 

28.  $\xrightarrow{Br_2,\text{ Fe}}$ A; A can be :

(a) 
(b) 

(c) 
(d) no reaction

29. According to Huckel rule a cyclic conjugated polyene is aromatic if it contains :
(a) $(4n+1)$ π-electron
(b) $(4n+2)$ π-electron
(c) $(2n+2)$ π-electron
(d) $4n$ π-electron

30. Phenol $\xrightarrow{\text{Zn-dust}} A \xrightarrow[+\,H_2SO_4]{\text{Conc. }HNO_3} B \xrightarrow[\text{NaOH}]{\text{Zn}} C$

In the above reaction A, B and C are :
(a) benzene, nitrobenzene and aniline
(b) benzene, dinitrobenzene and m-nitroaniline

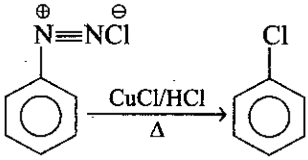
(c) benzene, nitrobenzene and hydrazobenzene
(d) toluene, *m*-nitrobenzene and *m*-toludine

31. When phenol is treated with excess of bromine water, it gives :
(a) *m*-bromophenol (b) *o*-and *p*-bromophenol
(c) 2, 4-dibromophenol (d) 2, 4, 6-tribromophenol

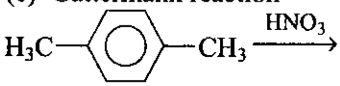
32. Picric acid is yellow coloured compound, its chemical name :
(a) *m*-nitrobenzoic acid (b) 2, 4, 6-trinitrophenol
(c) trinitrotoluene (d) trinitroaniline

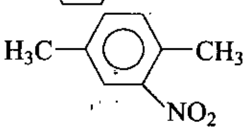
33. The product of following reaction is $C_6H_6 + Cl_2 \xrightarrow{hv} ?$
(a) C_6H_5Cl (b) *ortho* $C_6H_4Cl_2$ (c) $C_6H_6Cl_6$ (d) *para* $C_6H_4Cl_2$

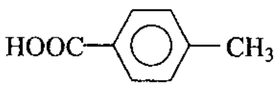
34. Which of the following compounds react slower than benzene in electrophilic bromination?
(a) $C_6H_5CH_3$ (b) C_6H_5OH (c) $C_6H_5NO_2$ (d) $C_6H_5\ddot{N}H_2$

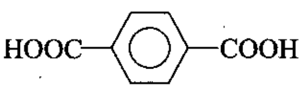
35. The reaction  $+ N_2 + CuCl$, is known as :

(a) Wurtz reaction (b) Sandmeyer reaction
(c) Gattermann reaction (d) Friedel-Crafts reaction

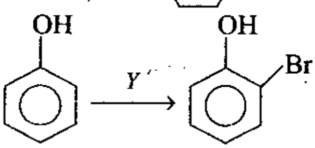
36.  X ; X is :

(a) 

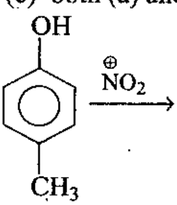
(b) 

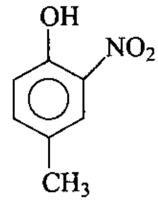
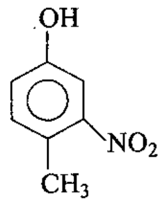
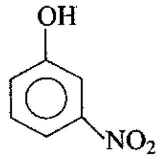
(c) 

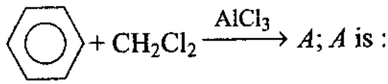
(d) none of these

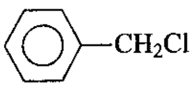
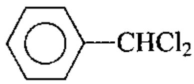
37.  ; Y can be :

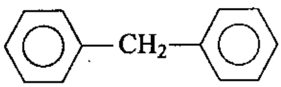
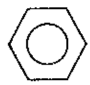
(a) Br_2 water (b) Br_2/CS_2
(c) both (a) and (b) (d) none is correct

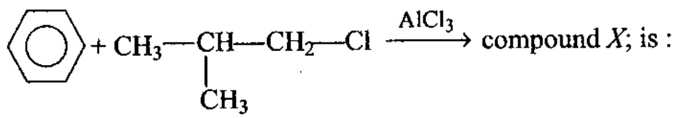
38.  A; A can be :

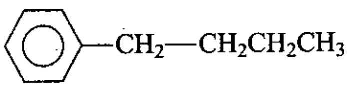
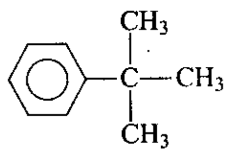
(a)  (b)  (c)  (d) no reaction

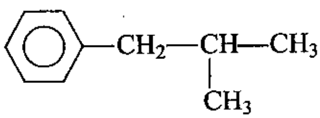
39. 

(a)  (b) 

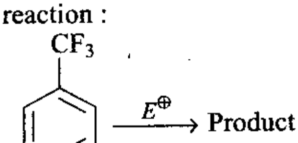
(c)  (d) 

40. 

(a)  (b) 

(c)  (d) all are correct

41. Consider the following reaction :

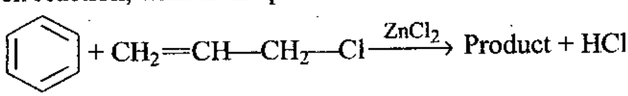


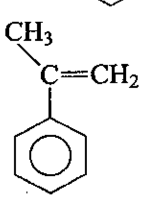
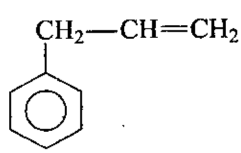
(i) CF_3 will activate benzene ring (ii) CF_3 will deactivate benzene ring
(iii) CF_3 is *m*-directing (iv) CF_3 is *o*/*p* directing

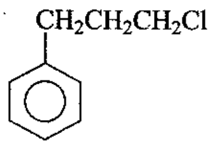
Select the correct options :

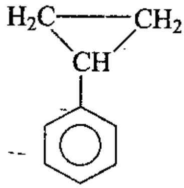
(a) (i) and (iv) (b) (ii) and (iii)
(c) (i) and (iii) (d) (ii) and (iv)

42. In the given reaction, what is the product?



(a)  (b) 

(c) 

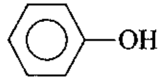
(d) 

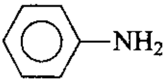
43. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives :

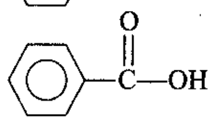
(a) benzoyl chloride
(b) benzyl chloride
(c) *o*-and *p*-chlorotoluene
(d) *m*-chlorotoluene

44. Chlorination of toluene in the presence of light and heat followed by treatment with aq. KOH and subsequently with dil. HCl gives :

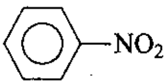
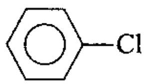
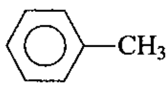
(a) 

(b) 

(c) 

(d) 

45. Among the following compounds that can be most readily sulphonated is :

(a) 
(b) 
(c) 
(d) 

46. Aniline react with $NaNO_2$ and dil. HCl at 0–5°C to form :

(a) *p*-nitro aniline
(b) 2, 4, 6-trinitroaniline
(c) benzene diazonium chloride
(d) benzene

47. In the chlorination of benzene with Cl_2 in the presence of $FeCl_3$ the electrophilic species that attack the benzene ring is :

(a) $Cl^{\oplus}$
(b) $Cl—\overset{\oplus}{Cl}—\overset{\ominus}{F}eCl_3$
(c) $Cl^{\ominus}$
(d) $Cl^{\bullet}$

48. Which of the following represents Friedel-Crafts reaction?

(a) $C_6H_6 + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_5C_2H_5 + HCl$

(b) $C_6H_5OH + HCl \xrightarrow{ZnCl_2} C_6H_5Cl + H_2O$

(c) $C_6H_5Cl + CH_3COCl \xrightarrow{AlCl_3} C_6H_5COCH_3 + Cl_2$

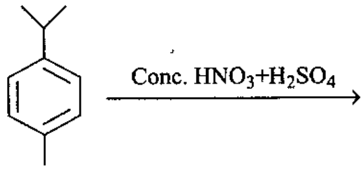
(d) $C_2H_5Br + Mg \xrightarrow{\text{ether}} C_2H_5MgBr$

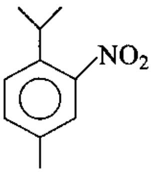
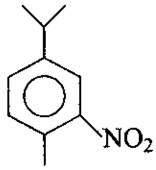
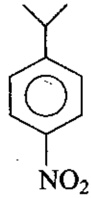
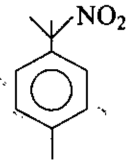
49. The majos product formed in the reaction

$$C_6H_5—\overset{\oplus}{N}{\equiv}N\,Cl^{\ominus} + H_3PO_2 + H_2O \longrightarrow \text{is :}$$

(a) C_6H_5OH
(b) C_6H_5Cl
(c) C_6H_6
(d) $C_6H_5C_6H_5$

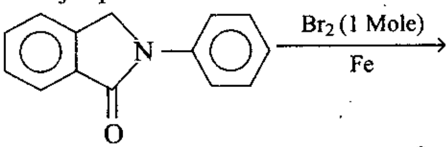
50. The major product formed in the reaction :

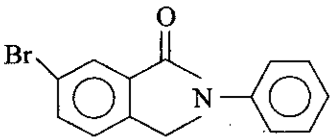
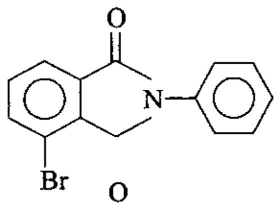
 is :

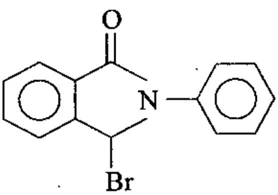
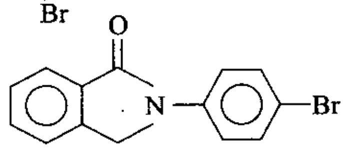
(a)  (b)  (c)  (d) 

LEVEL-3

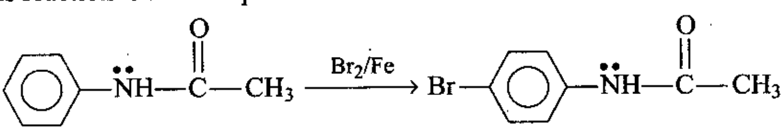
1. In the reaction the major product formed is :



(a)  (b) 

(c)  (d) 

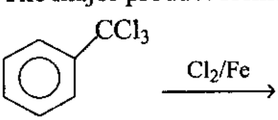
2. This reaction is an example of :

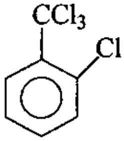


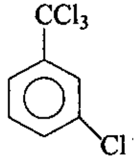
(a) substitution reaction (b) addition reaction

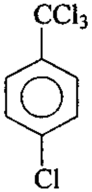
(c) condensation reaction (d) elimination reaction

3. The major product formed in the reaction is :

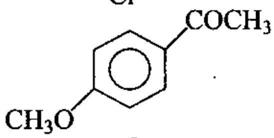


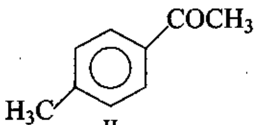
(a) 

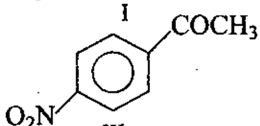
(b) 

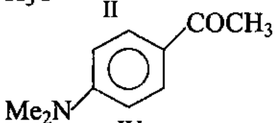
(c) 

(d) all in the equal amount

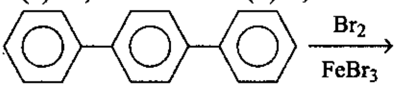
4. 
I

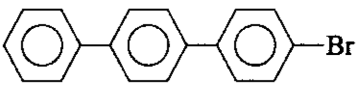

II

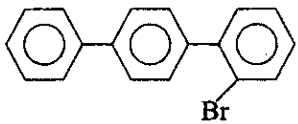

III

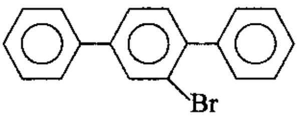

IV

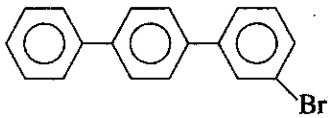
Friedel-Crafts acylation reaction can be used to obtained the compounds :
(a) II, III and IV (b) I, II and IV (c) I and II (d) II and III

5.  Product ; is :

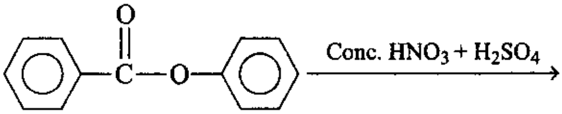
(a) 

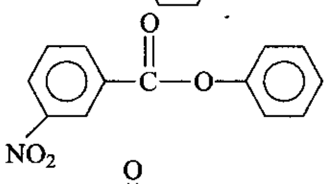
(b) 

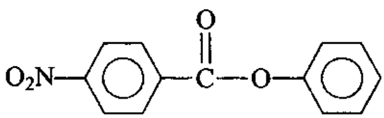
(c) 

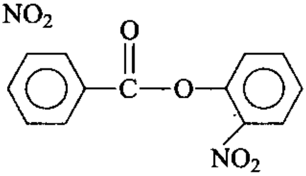
(d) 

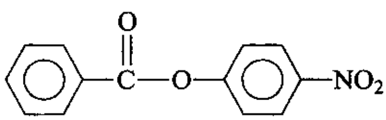
6. The major product in the reaction is :



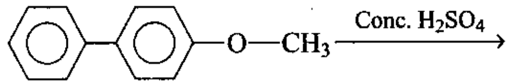
(a) 

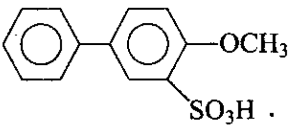
(b) 

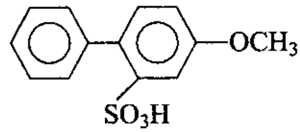
(c) 

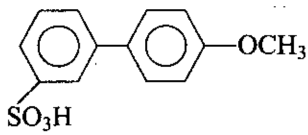
(d) 

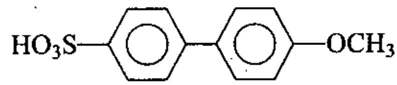
7. The major product formed in the reaction :

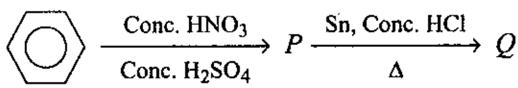


(a) 

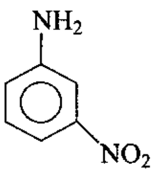
(b) 

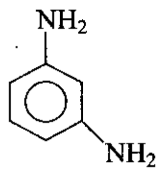
(c) 

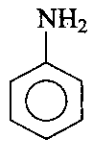
(d) 

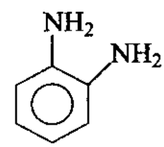
8. 

The product Q is :

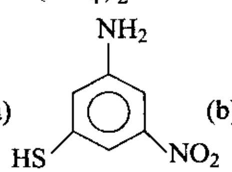
(a) 

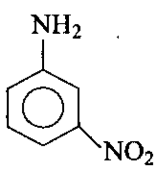
(b) 

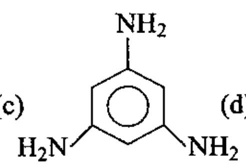
(c) 

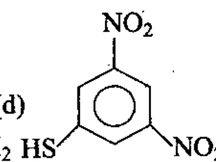
(d) 

9. Which of the following is formed as a product when *m*-dinitrobenzene is treated with $(NH_4)_2S$?

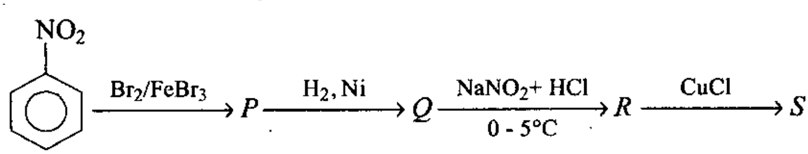
(a) 

(b) 

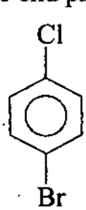
(c) 

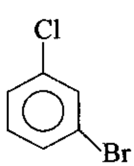
(d) 

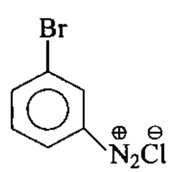
10. Consider the following reactions,

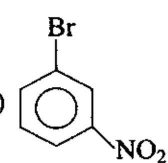


The end product 'S' is :

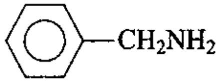
(a) 

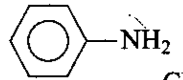
(b) 

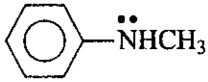
(c) 

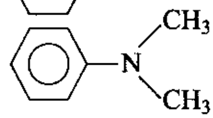
(d) 

11. Which of the following compounds will form a yellow-coloured oily compound on treatment with $NaNO_2$ and HCl at 0-5°C?

(a) 

(b) 

(c) 

(d) 

12. In Friedel-Crafts acylation reaction the electrophile is :

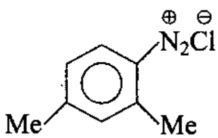
(a) $R^{\oplus}$

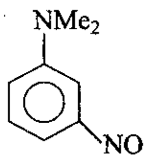
(b) $R-\overset{\oplus}{C}=O$

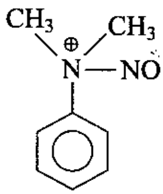
(c) $R-\overset{\bullet}{C}=O$

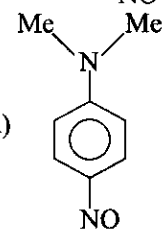
(d) $R-\overset{\oplus}{\underset{\underset{Cl}{|}}{C}}-O-\overset{\ominus}{Al}Cl_3$

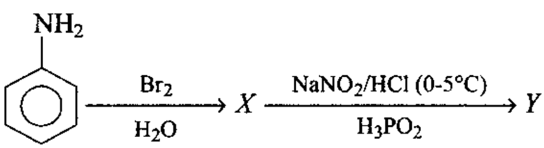
13. N, N-Dimethyl aniline react with $NaNO_2$ and dilute HCl at 0-5°C to form :

(a) 

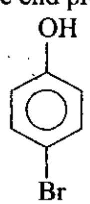
(b) 

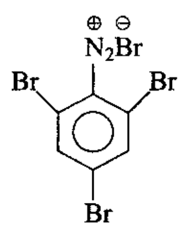
(c) 

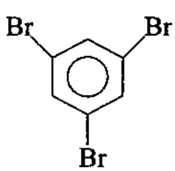
(d) 

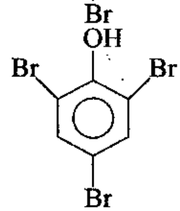
14. 

The end product Y is :

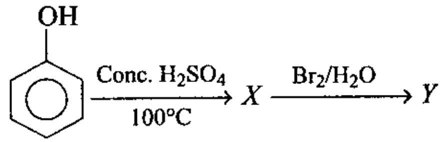
(a) 

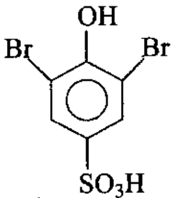
(b) 

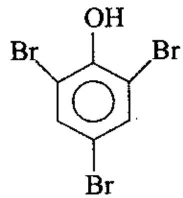
(c) 

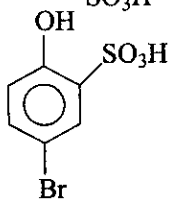
(d) 

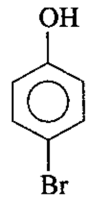
15. Identify the end product (Y) of the following sequence of reaction :



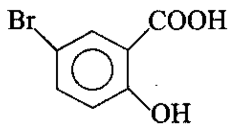
(a) 

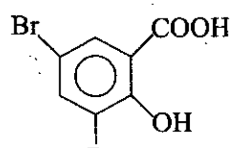
(b) 

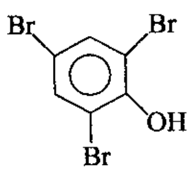
(c) 

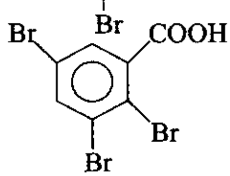
(d) 

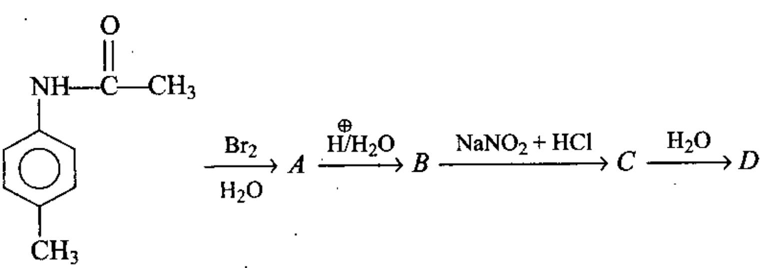
16. The action of Br_2/H_2O on salicylic acid results in the formation of :

(a) 

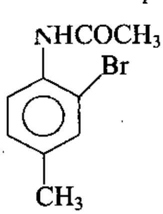
(b) 

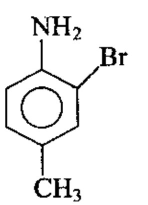
(c) 

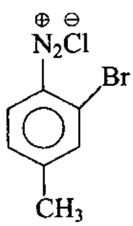
(d) 

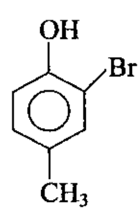
17. 

In the above sequence of reactions which one is not correct?

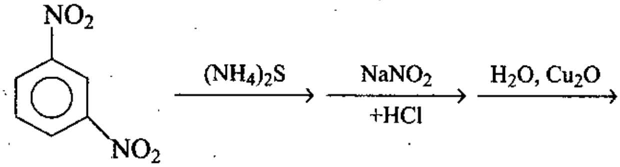
(a) 

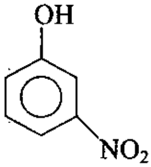
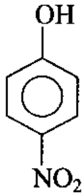
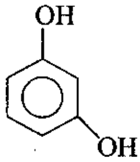
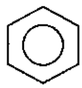
(b) 

(c) 

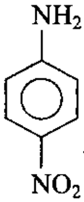
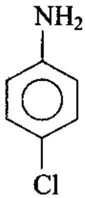
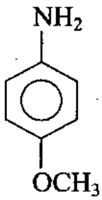
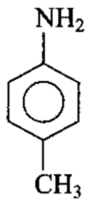
(d) 

18. The final product of the given reaction sequence :



(a) 
(b) 
(c) 
(d) 

19. Which one of the following aryl amine undergoes diazotisation most readily?

(a) 
(b) 
(c) 
(d) 

20. In the given reaction sequence

$$C_6H_5NO_2 \xrightarrow{Sn/HCl} A \xrightarrow{NaNO_2 + HCl} B \xrightarrow{CuCN/HCN} C \xrightarrow[\Delta]{H_2O/H^{\oplus}} D$$

which one is not correct?

(a) A is $C_6H_5NH_2$

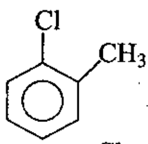
(b) B is $C_6H_5—\overset{\oplus}{N}\equiv N\ \overset{\ominus}{Cl}$

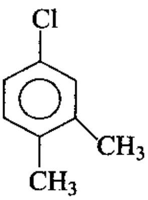
(c) C is $C_6H_5CH_2CN$

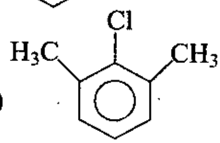
(d) D is C_6H_5COOH

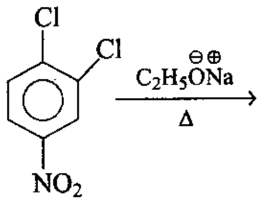
21. Which one of the following substrate will not form benzyne when treated with $NaNH_2$?

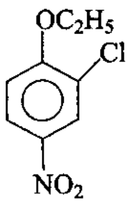
(a) C_6H_5Cl

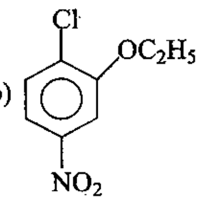
(b) 

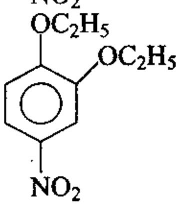
(c) 

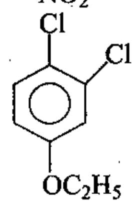
(d) 

22.  P; P is :

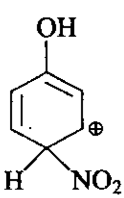
(a) 

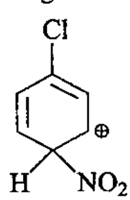
(b) 

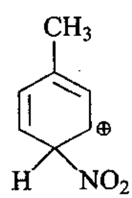
(c) 

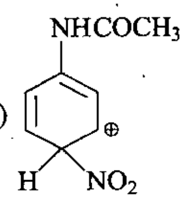
(d) 

23. Which one of the following is most stable carbocation?

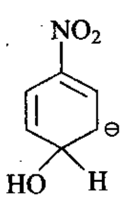
(a) 

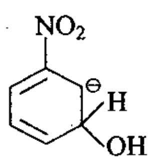
(b) 

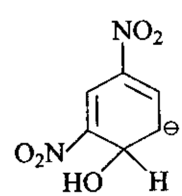
(c) 

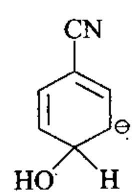
(d) 

24. Which one of the following is most stable carbanion?

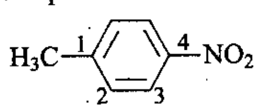
(a) 

(b) 

(c) 

(d) 

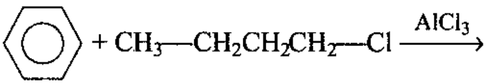
25. Nitration of the following compound will occur at which position?

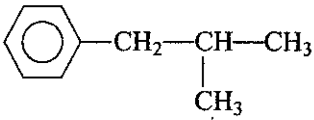


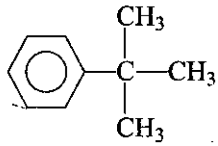
(a) at C—1
(b) at C—2
(c) at C—3
(d) at C—4

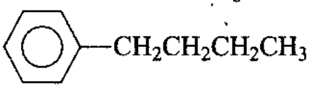
26. Nitrating agent for aromatic compound may be :

(a) N_2O_5
(b) $C_2H_5ONO_2$
(c) $NO_2CF_3SO_3$
(d) all of these

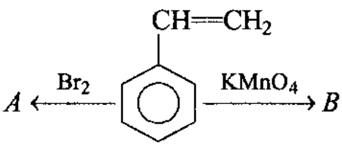
27.  ; Major product X is :

(a) 

(b) 

(c) 

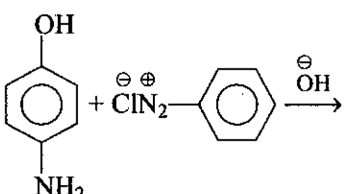
(d) none is correct

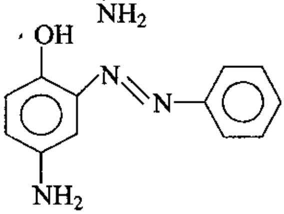
28. 

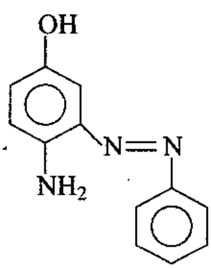
Compound A and B respectively are :

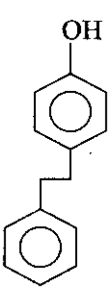
(a) *o*-bromo styrene, benzoic acid
(b) *p*-bromo styrene, benzaldehyde
(c) *m*-bromo styrene, benzaldehyde
(d) styrene dibromide, benzoic acid

29. Consider the reaction

 A ; Here A is :

(a) 

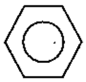
(b) 

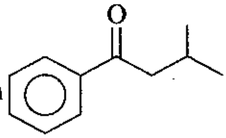
(c) 

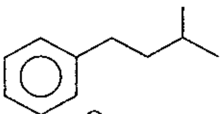
(d) none of these

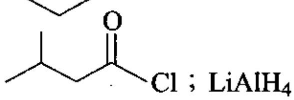
30. In which of the following reactions tertiary butyl benzene is formed ?

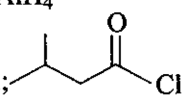
(a)  $+ Me_3C—OH + BF_3$ (b)  $+ Me_2C{=}CH_2 + H_2SO_4$

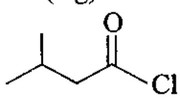
(c)  $+ Me_2CH—CH_2Cl + AlCl_3$ (d) All of these

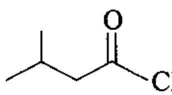
31. Benzene on reaction with A form  which on reaction with B

form  ; A and B are :

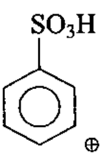
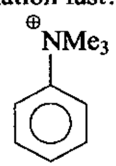
(a)  ; $LiAlH_4$

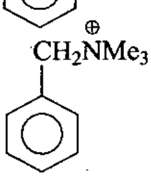
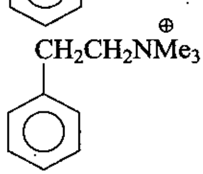
(b) Zn (Hg) + Conc. HCl; 

(c)  ; $NaBH_4$

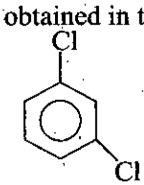
(d)  ; Zn (Hg) + Conc. HCl

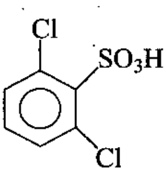
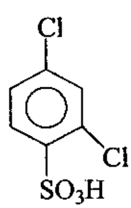
32. Which of the following undergoes sulphonation fast?

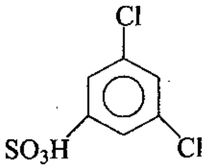
(a)  (b) 

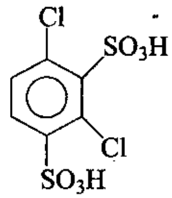
(c)  (d) 

33. The major product obtained in the reaction

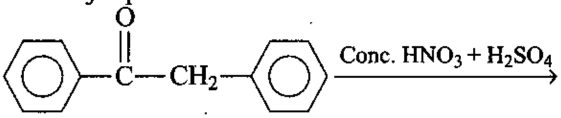
 $\xrightarrow[H_2SO_4]{SO_3}$ is :

(a)  (b) 

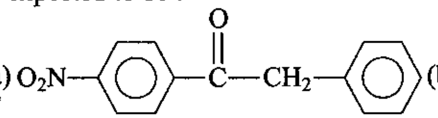
(c) 

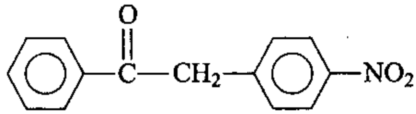
(d) 

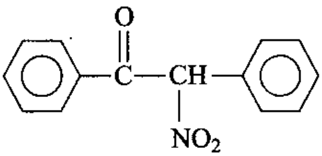
34. The major product obtained in the reaction

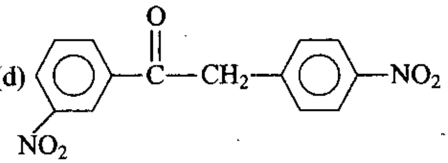


is expected to be :

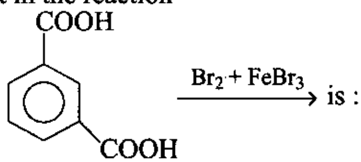
(a) 

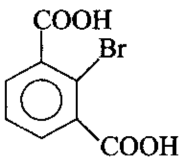
(b) 

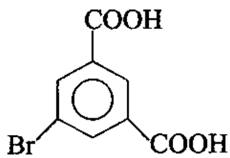
(c) 

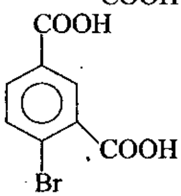
(d) 

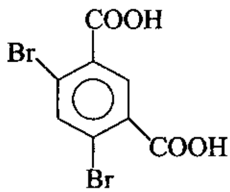
35. The major product in the reaction



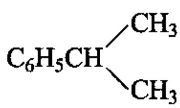
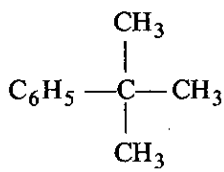
(a) 

(b) 

(c) 

(d) 

36. The order of reactivity of the following compounds

$C_6H_5CH_3$ (I) $\quad$ $C_6H_5CH_2CH_3$ (II) $\quad$  III $\quad$  IV

towards electrophilic substitution will be :

(a) I > II > III > IV
(b) IV > III > II > I
(c) II > I > III > IV
(d) III > II > I > IV

37. In sulphonation, acylation and formylation of benzene the group of effective electrophiles would be :

(a) $SO_3^{\oplus}, CH_3-C\equiv\overset{\oplus}{O}, HC\overset{\oplus}{O}$ (b) $\overset{\oplus}{S}O_3H, CH_3CO, HCO$

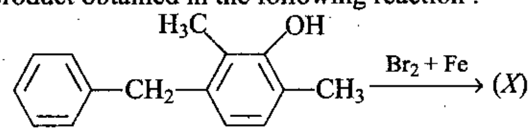
(c) $SO_3, CH_3-C\equiv\overset{\oplus}{O}, H\overset{\oplus}{C}O$ (d) $SO_3, CH_3CHO, CO+HCl$

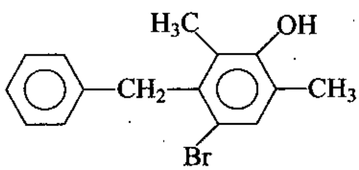
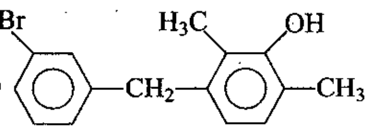
38. A Friedel-Crafts reaction of benzene with chloroform produces :

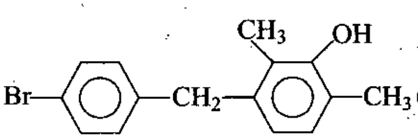
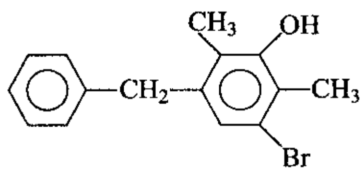
(a) $C_6H_5CHCl_2$ (b) $C_6H_5-\underset{H}{\overset{Cl}{C}}-C_6H_5$

(c) $C_6H_5-\underset{H}{\overset{C_6H_5}{C}}-C_6H_5$ (d) all of these

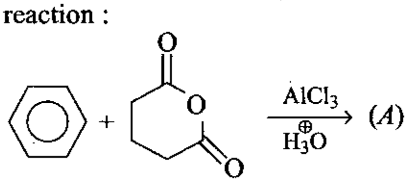
39. Identify the product obtained in the following reaction :

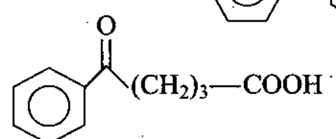


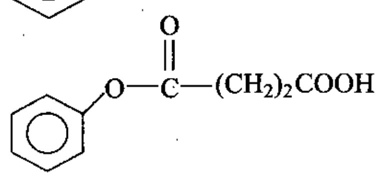
(a)  (b) 

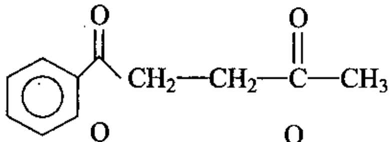
(c)  (d) 

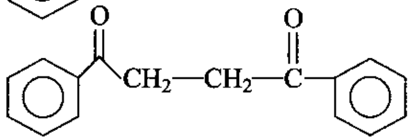
40. Product of the given reaction :



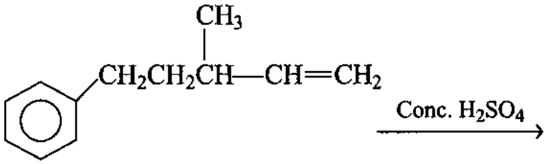
(a) 

(b) 

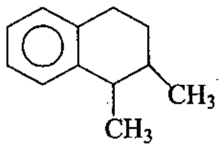
(c) 

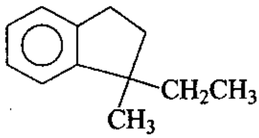
(d) 

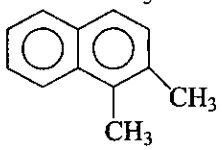
41. Consider the following reaction

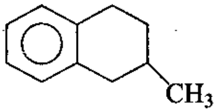


the major product is expected to be :

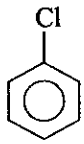
(a) 

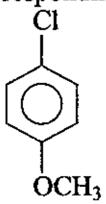
(b) 

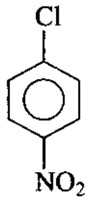
(c) 

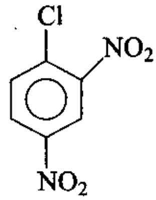
(d) 

42. Which one of the following compounds undergoes hydrolysis most readily by aq. NaOH to furnish corresponding phenol?

(a) 

(b) 

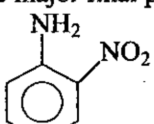
(c) 

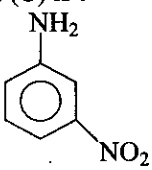
(d) 

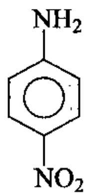
43. Consider the following sequence of reaction

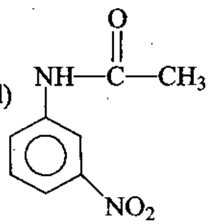
$$C_6H_5NH_2 \xrightarrow[\Delta]{Ac_2O} A \xrightarrow[H_2SO_4]{\text{Conc. } HNO_3} \underset{\text{(Major)}}{B} \xrightarrow{\text{aq. } H_2SO_4} \underset{\text{(Major)}}{C}$$

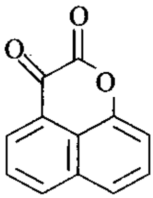
The major final product (C) is :

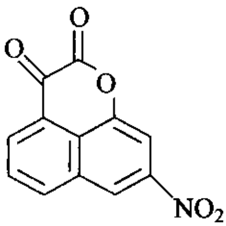
(a) 

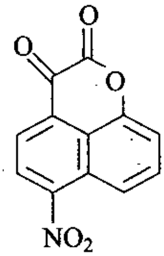
(b) 

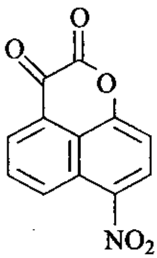
(c) 

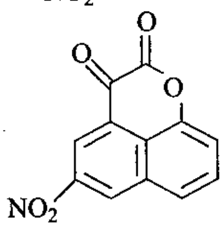
(d) 

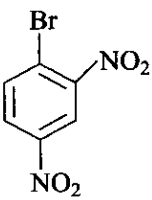
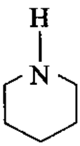
44.  $\xrightarrow{NO_2BF_4}$ gives :

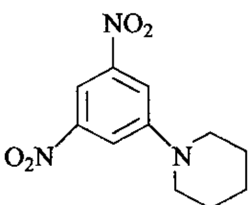
(a) 

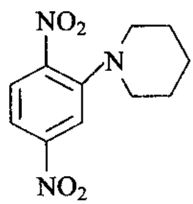
(b) 

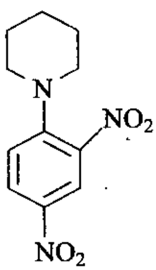
(c) 

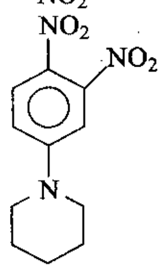
(d) 

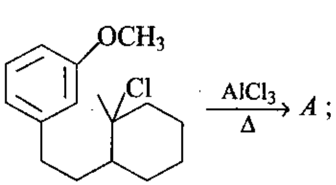
45.  +  $\longrightarrow$ X ; X is :

(a) 

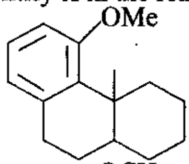
(b) 

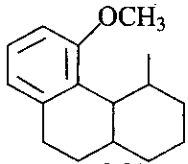
(c) 

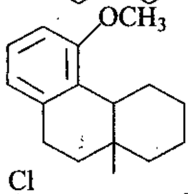
(d) 

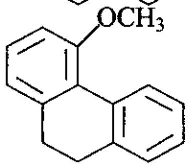
46. 

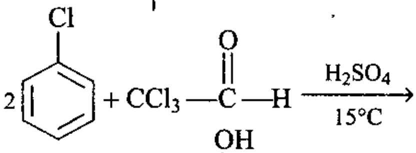
Identify A in the reaction :

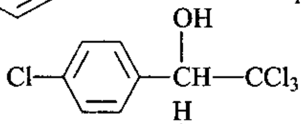
(a) 

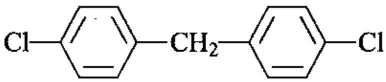
(b) 

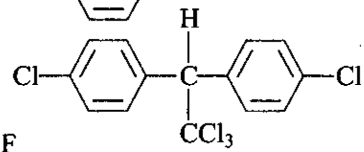
(c) 

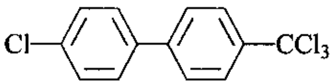
(d) 

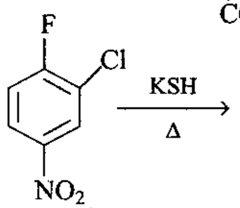
47.  P ; Identify P in the reaction :

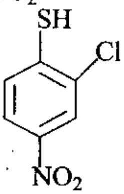
(a) 

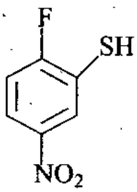
(b) 

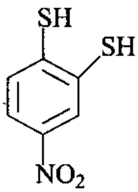
(c) 

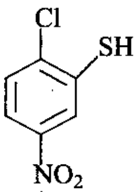
(d) 

48.  Y ; Identify Y in this reaction :

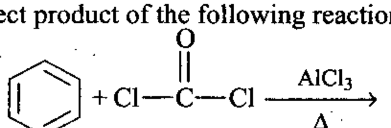
(a) 

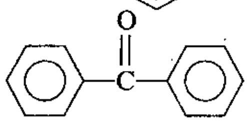
(b) 

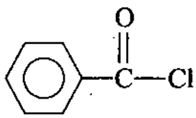
(c) 

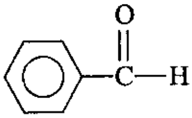
(d) 

49. Identify correct product of the following reaction :

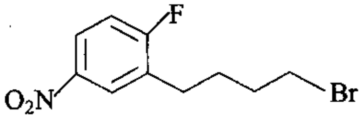


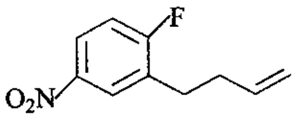
(a) 

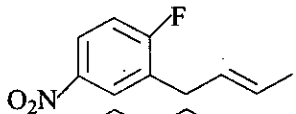
(b) 

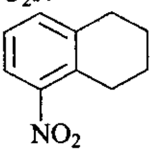
(c) 

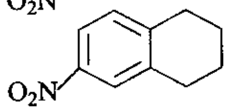
(d) none of these

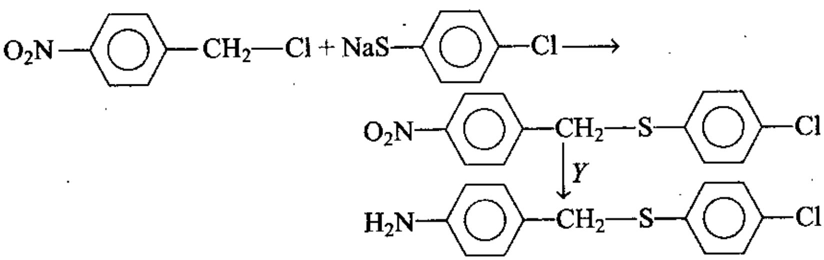
50.  $\xrightarrow[\text{dry ether}]{\text{Mg}}$ A ; Identify A :

(a) 

(b) 

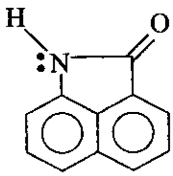
(c) 

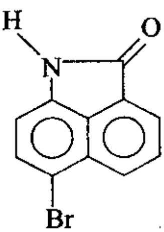
(d) 

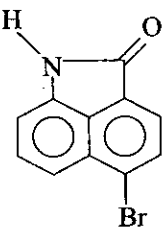
51. 

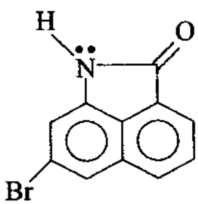
Find out missing reagent Y :

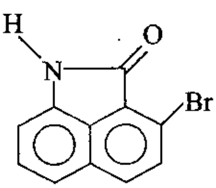
(a) Sn + HCl (b) Li + HCl (c) $C + CCl_4$ (d) Na + Ether

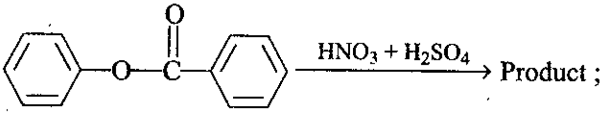
52.  $\xrightarrow{Br_2 + Fe}$ Z ; Identify Z :

(a) 

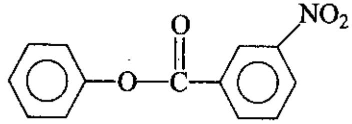
(b) 

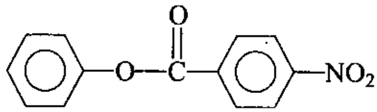
(c) 

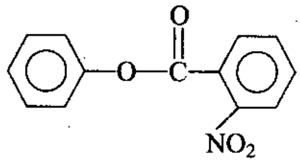
(d) 

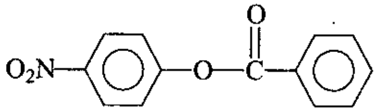
53. 

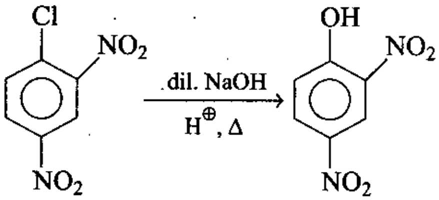
product of this reaction will be :

(a) 

(b) 

(c) 

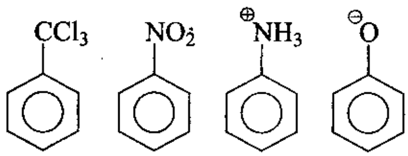
(d) 

54. 

; this reaction proceed through :

(a) electrophilic addition
(b) benzyne intermediate
(c) nucleophilic aromatic substitution
(d) oxirane

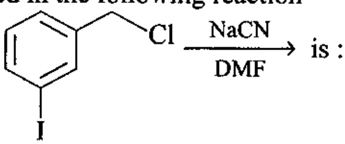
55. In which of the following cases nitration will take place at *m*-position :



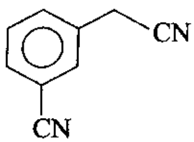
I II III IV

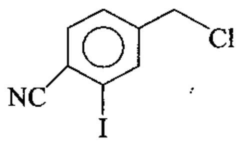
(a) I only (b) II, III and IV (c) I, III and IV (d) I, II and III

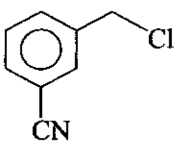
56. The major product formed in the following reaction

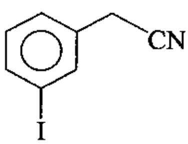


is :

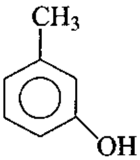
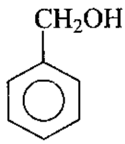
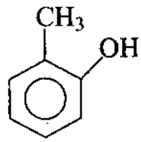
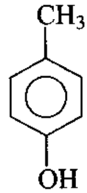
(a) 

(b) 

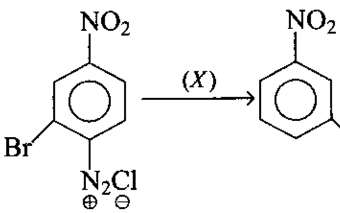
(c) 

(d) 

57. The structure of compound that gives a tribromo derivative on treatment with bromine water is :

(a)  (b)  (c)  (d) 

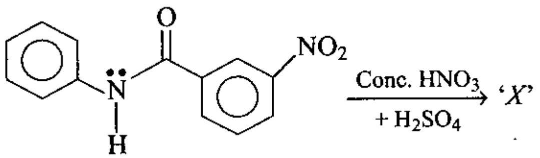
58. In the reaction

 ; X is :

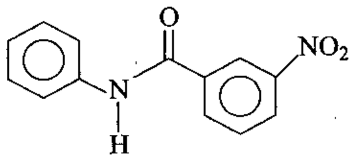
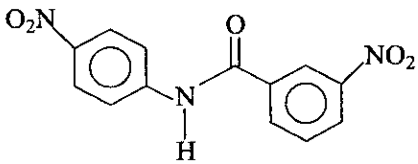
(a) H_3PO_2 (b) Cu_2Cl_2

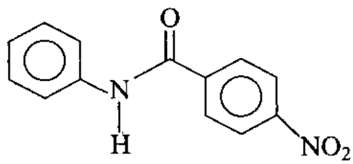
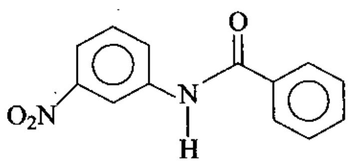
(c) $HgSO_4/H_2SO_4$ (d) $H^{\oplus}/H_2O$

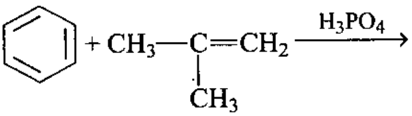
59. In the following reaction

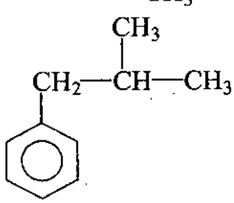
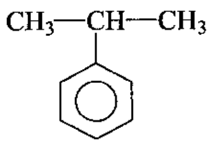


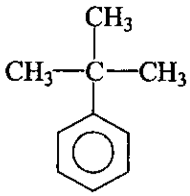
the structure of major product 'X' is :

(a)  (b) 

(c)  (d) 

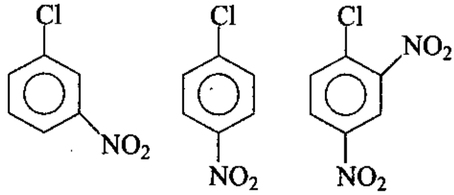
60.  X ; The compound X is :

(a)  (b) 

(c) 

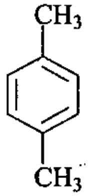
(d) none of these

61. Reactivity order of the following towards $\overset{\oplus}{Na}\overset{\ominus}{O}Et$, EtOH :



I II III

(a) II > I > III (b) I > III > II (c) II > III > I (d) III > II > I

62. Ozonolysis of the following compound will produce;  is :

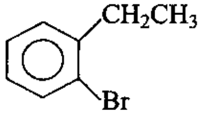
(a) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H,\ H-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H$

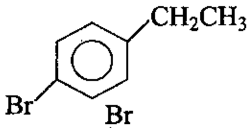
(b) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-CH_3,\ H-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H$

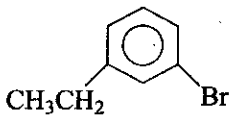
(c) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-CH_3,\ CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H$

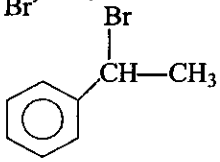
(d) $CH_3-\overset{\overset{O}{\|}}{C}-H,\ H-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-H$

63. Which of the following will be obtained by the bromination of ethylbenzene in presence of light?

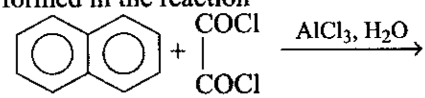
(a) 

(b) 

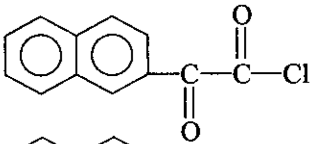
(c) 

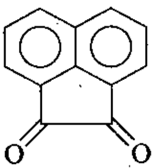
(d) 

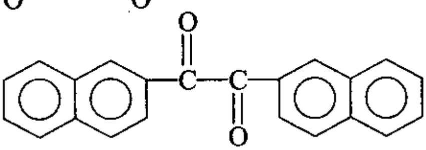
64. The major product formed in the reaction



is :

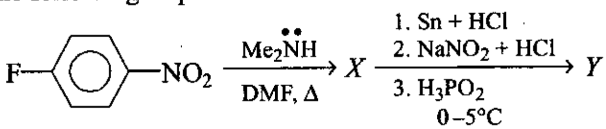
(a) 

(b) 

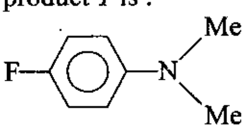
(c) 

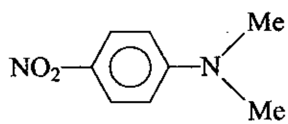
(d) none of the above

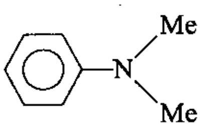
65. Consider the following sequence of reactions :

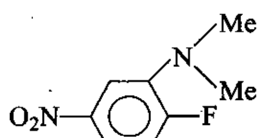


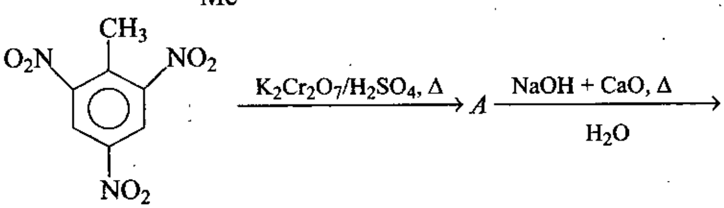
the product Y is :

(a) 

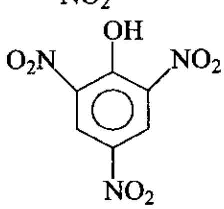
(b) 

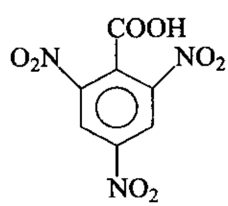
(c) 

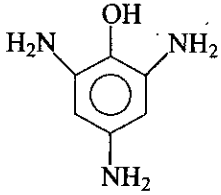
(d) 

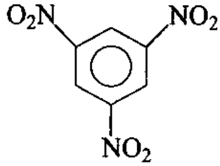
66. 

; identify B :

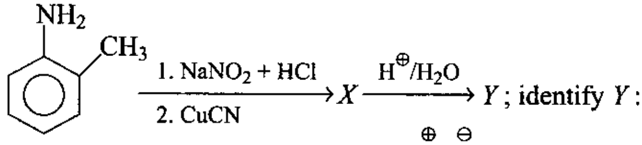
(a) 

(b) 

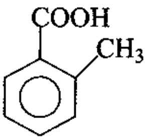
(c) 

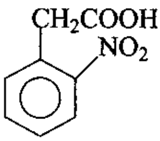
(d) 

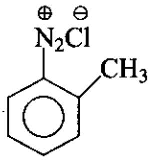
67. Consider the following sequence of reactions

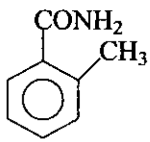


; identify Y:

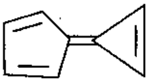
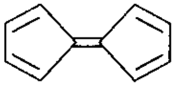
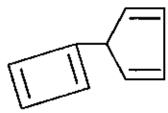
(a) 

(b) 

(c) 

(d) 

68. Which of the following molecules is expected to have the greatest resonance stabilisation?

(a)  (b)  (c)  (d) 

69. Arrange the following groups in order of decreasing *o*-and *p*-directing strength :

$-\ddot{N}H_2, -Cl, -\ddot{\underset{\cdot\cdot}{O}}H, -R$

(a) $-Cl > \ddot{\underset{\cdot\cdot}{O}}H > -R > -NH_2$

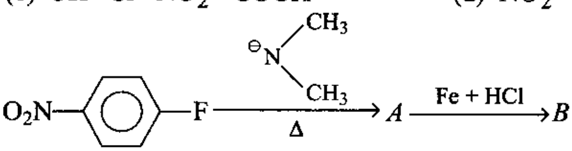
(b) $-\ddot{N}H_2 > -R > -Cl > -\ddot{\underset{\cdot\cdot}{O}}H$

(c) $-\ddot{N}H_2 > -\ddot{\underset{\cdot\cdot}{O}}H > -Cl > -R$

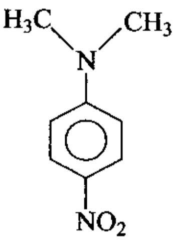
(d) $-\ddot{N}H_2 > -\ddot{\underset{\cdot\cdot}{O}}H > -R > -Cl$

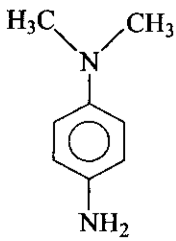
70. Arrange the following groups in order of decreasing electron attracting capacity :

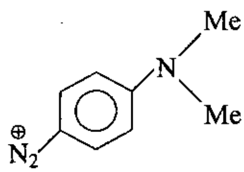
(a) NO_2 >COOH>Cl>OH
(b) Cl>OH>NO_2 >COOH
(c) OH>Cl>NO_2 >COOH
(d) NO_2 >COOH>OH>Cl

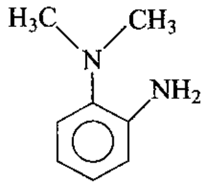
71. 

; Product B of reaction is :

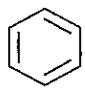
(a) 

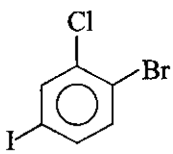
(b) 

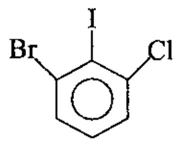
(c) 

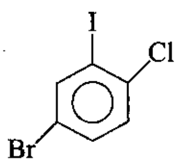
(d) 

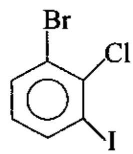
72. Identify product obtained by following sequence of reactions :

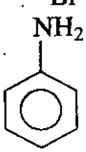
 $\xrightarrow[\substack{3.\ Fe + HCl \\ 4.\ Cl_2 + AlCl_3 \\ 5.\ NaNO_2 + HCl \\ 6.\ KI}]{\substack{1.\ HNO_3 + H_2SO_4 \\ 2.\ Br_2 + FeBr_3}}$?

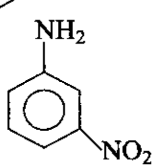
(a) 

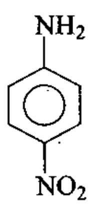
(b) 

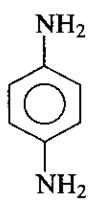
(c) 

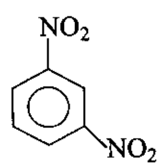
(d) 

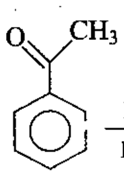
73.  $\xrightarrow{(CH_3CO)_2O} A \xrightarrow[H_2SO_4]{HNO_3} B \xrightarrow{H^{\oplus}/H_2O} C$; Identify C :

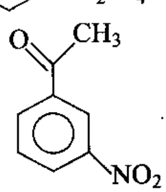
(a) 

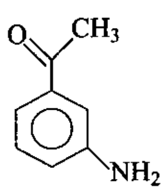
(b) 

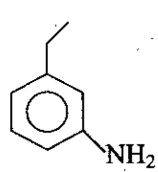
(c) 

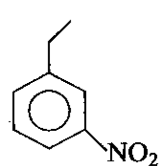
(d) 

74.  $\xrightarrow[H_2SO_4]{HNO_3} X \xrightarrow[HCl]{Zn(Hg)} Y$; Identify 'Y' :

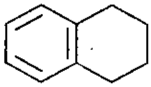
(a) 

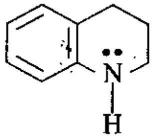
(b) 

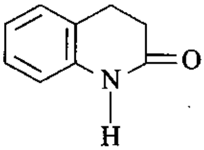
(c) 

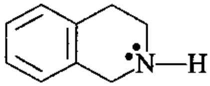
(d) 

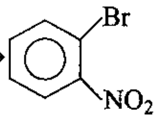
75. Which of the following compounds undergoes nitration at fastest rate?

(a) 

(b) 

(c) 

(d) 

76. For this reaction ? $\longrightarrow$  ; the best reactants are :

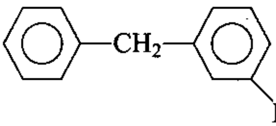
(a) $C_6H_5Br + HNO_3$ and H_2SO_4

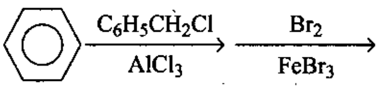
(b) $C_6H_5NO_2 + Br_2, FeBr_3$

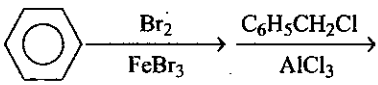
(c) $C_6H_5Br + H_2SO_4$, Δ

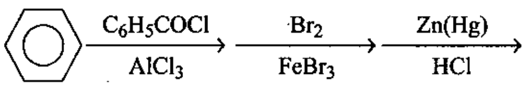
(d) $C_6H_5NO_2 + HBr$

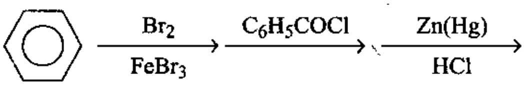
77. Which sequence of steps describes the best synthesis of compound

 ?

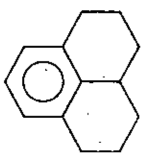
(a) 

(b) 

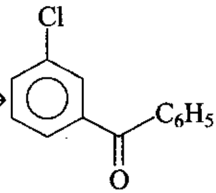
(c) 

(d) 

78. How many benzylic hydrogens are present in the hydrocarbon shown?



(a) 3 (b) 5 (c) 4 (d) 6

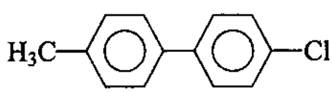
79. For this reaction? ⟶  ; The best reactants are :

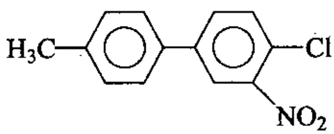
(a) $C_6H_5Cl + C_6H_5-\overset{\overset{\displaystyle O}{\|}}{C}-Cl, AlCl_3$

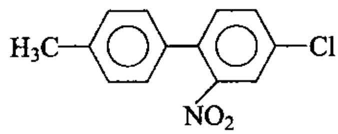
(b) $C_6H_5-\overset{\overset{\displaystyle O}{\|}}{C}-CH_3 + Cl_2, FeCl_3$

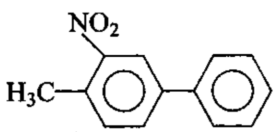
(c) $C_6H_5-CH_2-C_6H_5 + Cl_2, FeCl_3$ followed by oxidation

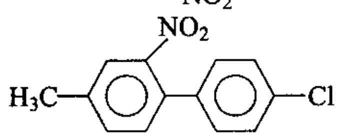
(d) none of these yield the desired product

80.  $\xrightarrow{HNO_3 + H_2SO_4}$? Identify the major product :

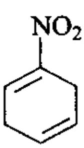
(a) 

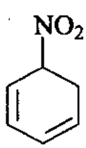
(b) 

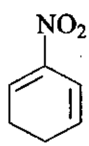
(c) 

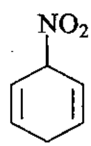
(d) 

81. Birch reduction of nitrobenzene will produce :

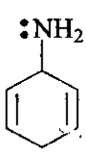
(a) 

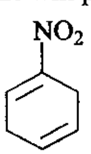
(b) 

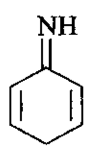
(c) 

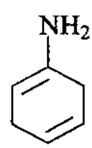
(d) 

82. Birch reduction of aniline will produce :

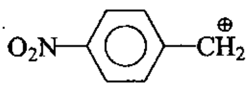
(a) 

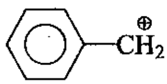
(b) 

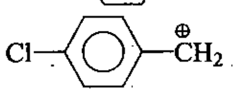
(c) 

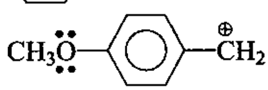
(d) 

83. Most stable carbocation is :

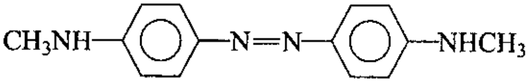
(a) 

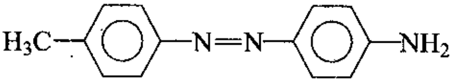
(b) 

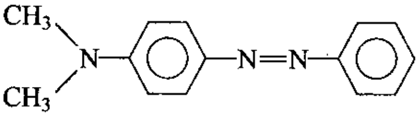
(c) 

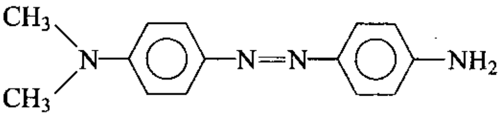
(d) 

84. Aniline when diazotised in cold and then treated with dimethyl aniline gives a coloured product. Its structure would be :

(a) 

(b) 

(c) 

(d) 

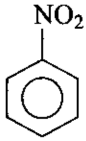
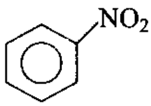
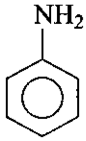
85. Rank the following compounds in order of decreasing reactivity for bromination :

$$\underset{(1)}{C_6H_5-\overset{\oplus}{N}Me_3}, \underset{(2)}{C_6H_5-CH_2-\overset{\oplus}{N}Me_3}, \underset{(3)}{C_6H_5-NMe_2}, \underset{(4)}{C_6H_5-CH_3}$$

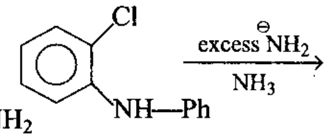
(a) $3 > 4 > 2 > 1$ (b) $1 > 3 > 4 > 2$

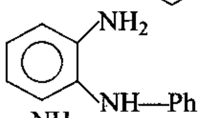
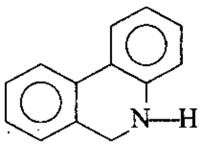
(c) $3 > 4 > 1 > 2$ (d) $4 > 3 > 1 > 2$

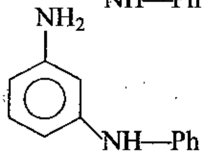
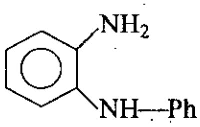
86. Which of the following compounds will not give Friedel-Crafts reaction?

(a)  (b)  (c)  (d) all of these

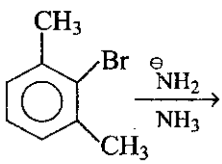
87. Find out correct product of the following reaction :



(a)  (b) 

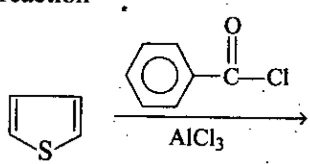
(c)  (d) 

88. Find out correct statement for this reaction :

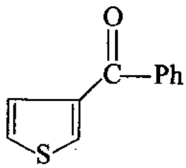


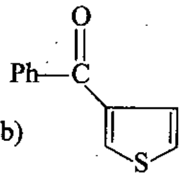
(a) compound shows elimination addition reaction
(b) reaction is addition elimination
(c) reaction is also known as cine substitution
(d) no reaction

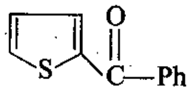
89. Major product form in the reaction

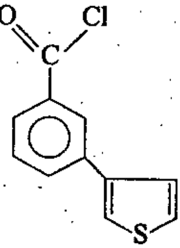


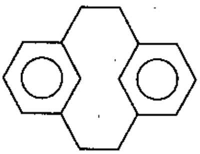
is :

(a) 

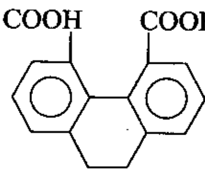
(b) 

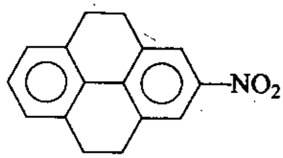
(c) 

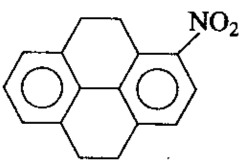
(d) 

90.  $\xrightarrow[H^{\oplus}\text{(Catalyst)}]{HNO_3}$ Product;

product of the reaction will be :

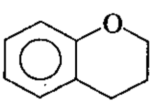
(a) 

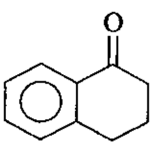
(b) 

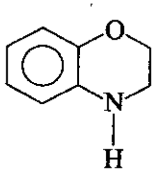
(c) 

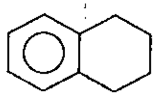
(d) all are incorrect

91. Rank the following compounds in decreasing order of reactivity in electrophilic aromatic substitution reaction :



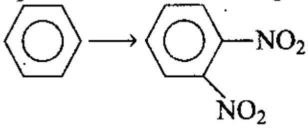
(1)


(2)


(3)

(4)

(a) $3 > 1 > 2 > 4$
(b) $4 > 3 > 2 > 1$
(c) $3 > 1 > 4 > 2$
(d) $1 > 3 > 4 > 2$

92. Give the best reaction sequence for the following transformation :



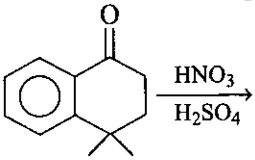
(a) $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[H_2SO_4]{SO_3} \xrightarrow[HCl]{Fe} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[H_2O]{H^{\oplus}} \xrightarrow{CF_3CO_3H}$

(b) $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[HCl]{Fe} \xrightarrow{CH_3COCl} \xrightarrow[H_2SO_4]{SO_3} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow{H^{\oplus}/H_2O} \xrightarrow{CF_3CO_3H}$

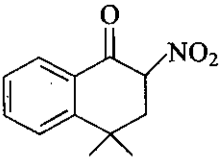
(c) $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[HCl]{Fe} \xrightarrow{CH_3COCl} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow{CF_3CO_3H}$

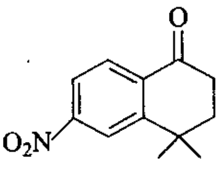
(d) $\xrightarrow[H_2SO_4]{SO_3} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[HCl]{Fe} \xrightarrow{CH_3COCl} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[H_2O]{H^{\oplus}} \xrightarrow{CF_3CO_3H}$

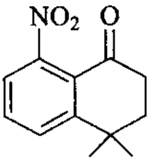
93. Give the major product of the following reaction;

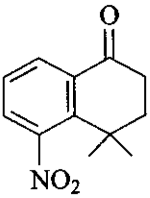


Major product :

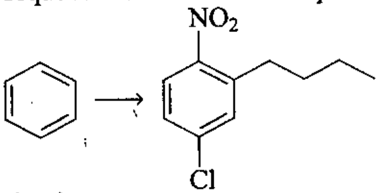
(a) 

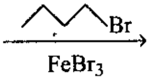
(b) 

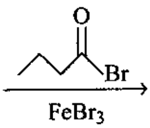
(c) 

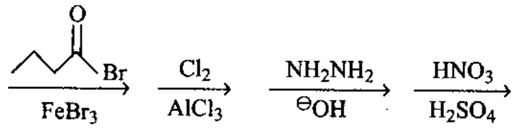
(d) 

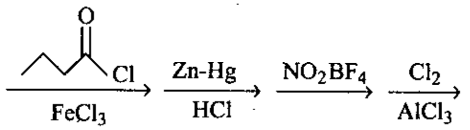
94. Choose the best sequence of reaction to complete the following reaction :



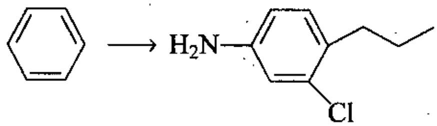
(a) $\xrightarrow[AlCl_3]{Cl_2}$  $\xrightarrow[H_2SO_4]{HNO_3}$

(b) $\xrightarrow{NO_2BF_4}$  $\xrightarrow[HCl]{Zn\text{-}Hg} \xrightarrow[AlCl_3]{Cl_2} \xrightarrow{CF_3CO_3H}$

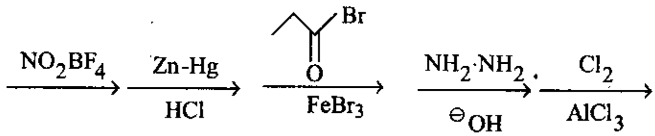
(c) 

(d) 

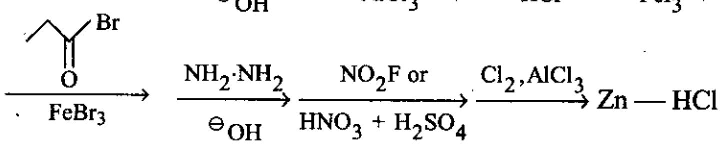
95. Choose the best reaction sequence for the following conversion :



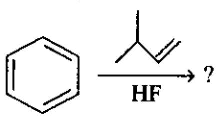
(a) $\xrightarrow{NO_2Cl} \xrightarrow[\ominus OH]{NH_2 \cdot NH_3} \xrightarrow[FeBr_3]{CH_3CH_2CH_2Br} \xrightarrow[AlCl_3]{Cl_2}$

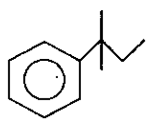
(b) 

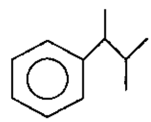
(c) $\xrightarrow{HNO_3 + H_2SO_4} \xrightarrow[\ominus OH]{NH_2 \cdot NH_2} \xrightarrow[AlCl_3]{CH_3CH_2C(=O)-Cl} \xrightarrow[HCl]{Zn\text{-}Hg} \xrightarrow[FeI_3]{Cl_2}$

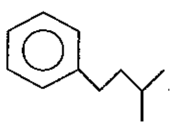
(d) 

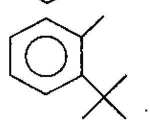
96. Give the major product of following reaction :



(a) 

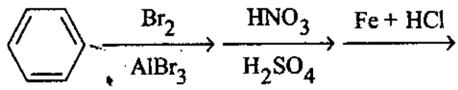
(b) 

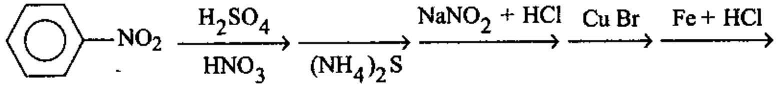
(c) 

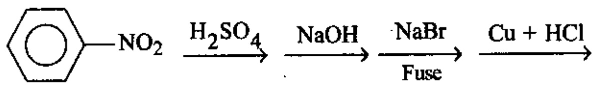
(d) 

97. Which is the best way to prepare *m*-bromoaniline?

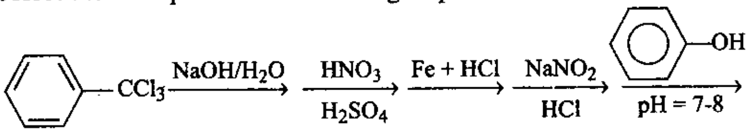
(a) Aniline $\xrightarrow{H_2SO_4} \xrightarrow{Br_2} \xrightarrow{H^{\oplus}/H_2O}$

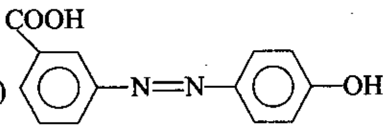
(b) 

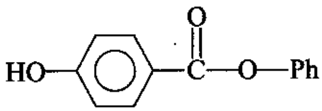
(c) 

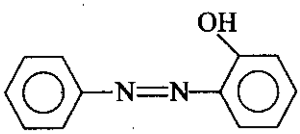
(d) 

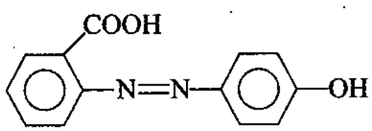
98. Select the final product of following sequence of reaction :



(a) 

(b) 

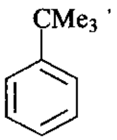
(c) 

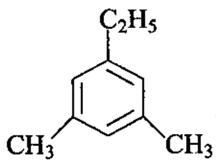
(d) 

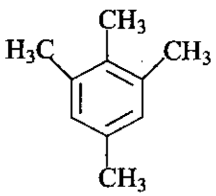
99. $A\,(C_{10}H_{14}) + Cl_2,\ \Delta \longrightarrow C_{10}H_{13}Cl$ (one isomer)

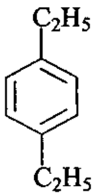
$A + Cl_2\,/\,FeCl_3 \longrightarrow C_{10}H_{13}Cl$ (two isomers)

Possible structure of A is :

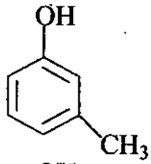
(a) 

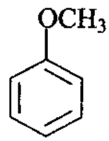
(b) 

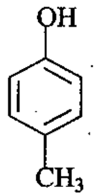
(c) 

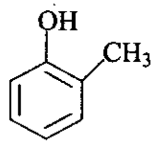
(d) 

100. A compound 'A' (C_7H_8O) is insoluble in water, dilute HCl and aqueous $NaHCO_3$ but soluble in dilute NaOH. When A is treated with Br_2—H_2O, it is converted into a compound of formula $C_7H_5OBr_3$. Compound A is :

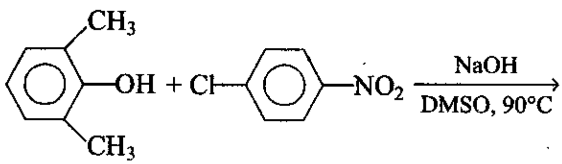
(a) 

(b) 

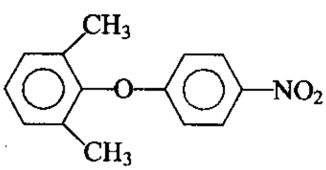
(c) 

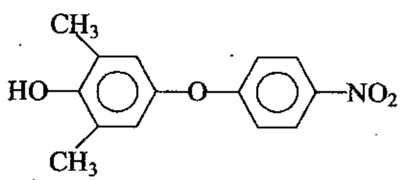
(d) 

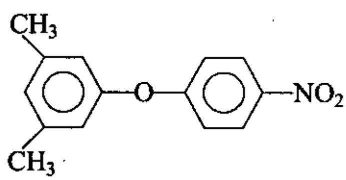
101. The major product of reaction,



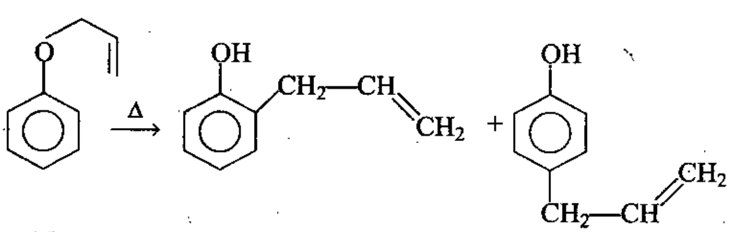
is :

(a) 

(b) 

(c) 

(d) none of these

102. 

(A) (B) (C)

Conversion of A into mixture of B and C by action of heat is an example of :

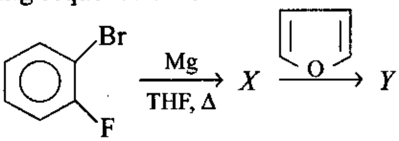
(a) Claisen rearrangement

(b) Cope elimination

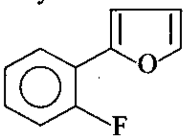
(c) Fries rearrangement

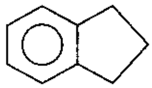
(d) Benzidine rearrangement

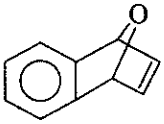
103. Consider the following sequence of reactions :

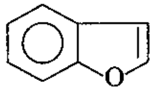


Identify 'Y'.

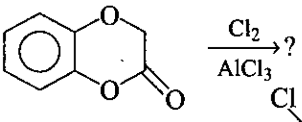
(a) 

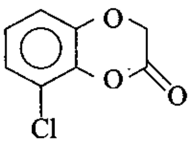
(b) 

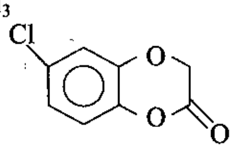
(c) 

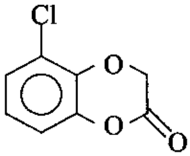
(d) 

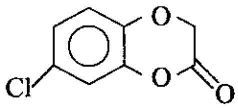
104. Predict major product in the following reaction,



(a) 

(b) 

(c) 

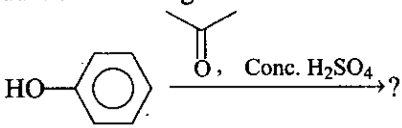
(d) 

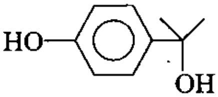
105. What function does HNO_3 serve in reaction of benzene with I_2 to produce iodobenzene?

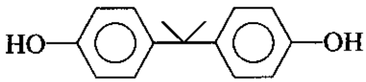
(a) The HNO_3 convert the $I^{\ominus}$ to I_2 (b) HNO_3 serve as catalyst

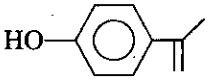
(c) HNO_3 convert I_2 to HI (d) HNO_3 convert I_2 to $I^{\oplus}$

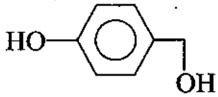
106. Find out correct product of following reaction :



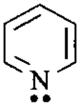
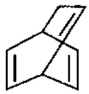
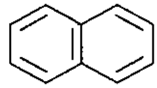
(a) 

(b) 

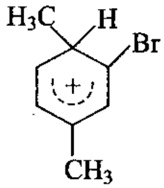
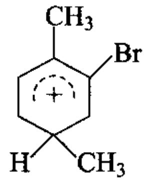
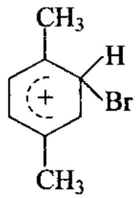
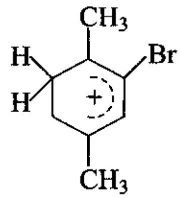
(c) 

(d) 

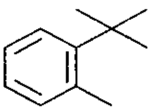
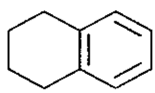
107. Which of the following compounds would not be considered aromatic in its behaviour?

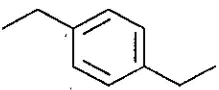
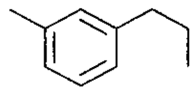
(a)  (b)  (c)  (d) 

108. Which of the following structure most closely represent as intermediate in the electrophilic bromination of *para*-xylene?

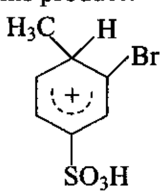
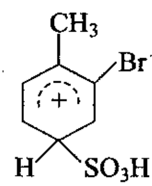
(a)  (b)  (c)  (d) 

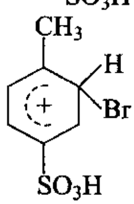
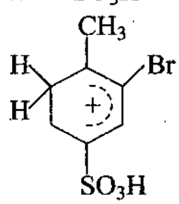
109. Which of the following compounds form *ortho*-benzenedicarboxylic acid when oxidized by hot aqueous $KMnO_4$?

(a)  (b) 

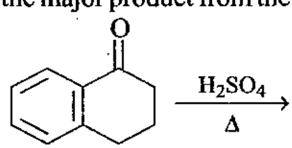
(c)  (d) 

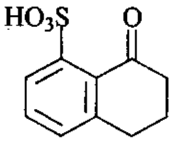
110. Electrophilic bromination of *p*-toluene sulphonic acid, followed by heat with 50% H_2SO_4 produces *ortho*-bromotoluene. Which of the following intermediate leads to this product?

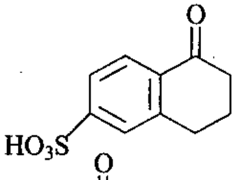
(a)  (b) 

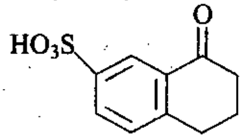
(c)  (d) 

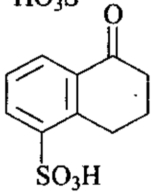
111. Which of the following is the major product from the sulphonation of α-tetralone?



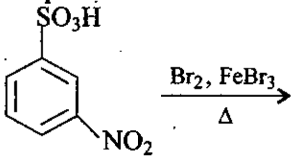
(a) 

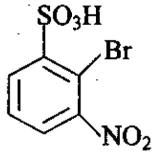
(b) 

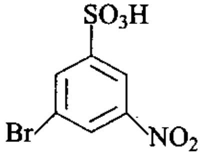
(c) 

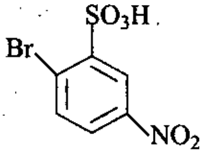
(d) 

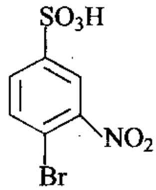
112. Which of the following is the major product from bromination of *meta*-nitrobenzene sulphonic acid?



(a) 

(b) 

(c) 

(d) 

113. When Friedel-Crafts alkylation of benzene is carried out with 1 equivalent of *tert*-butyl chloride, a large amount of *para*-di-*tert*-butyl benzene is formed along with monosubstitution product.

Why does not all the benzene react to give *tert*-butyl benzene (the *mono*-substitution product)?

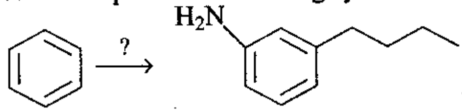
(a) The *tert*-butyl substituent activate the benzene ring to further substitution.
(b) The reaction is bimolecular, so two *tert*-butyl chloride molecule combine with one benzene molecule.
(c) The *tert*-butyl substituent is large and favours reaction at *para*-position.
(d) The disubstituted product is favoured in equilibrium with *mono*-substituted ring.

114. When *para*-bromotoluene is treated with $NaNH_2$ in ether the bromine is lost and mixture of *para* and *meta* $CH_3C_6H_4NH_2$ product is obtain. What kind of intermediate would account for this?

(a) A charge delocalised anion formed by nucleophilic addition of $NH_2^{\ominus}$ to the benzene ring.
(b) A charge delocalised anion formed by abstraction of methyl proton by the base $\overset{\ominus}{N}H_2$.

(c) An aryl cation formed by loss of bromide ion.
(d) A benzyne species formed by elimination of HBr.

115. How might one best accomplish the following synthesis?



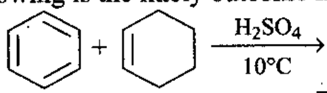
(a) (i) $C_4H_9 + AlCl_3$ (ii) HNO_3 and heat (iii) excess of H_2 and Pt catalyst

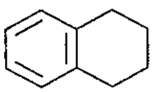
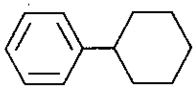
(b) (i) HNO_3 and heat (ii) $C_4H_9Cl + AlCl_3$ (iii) excess of H_2 and Pt catalyst

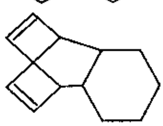
(c) (i) $C_3H_7COCl + AlCl_3$ (ii) HNO_3 and heat (iii) excess of H_2 and Pt catalyst

(d) (i) HNO_3 and heat (ii) $C_3H_7COCl + AlCl_3$ (iii) excess of H_2 and Pt catalyst

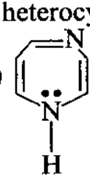
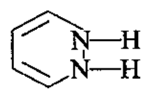
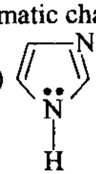
116. Which of the following is the likely outcome from this reaction?



(a)  (b) 

(c)  (d) $(C_{10}H_{10})_n$ Polymer

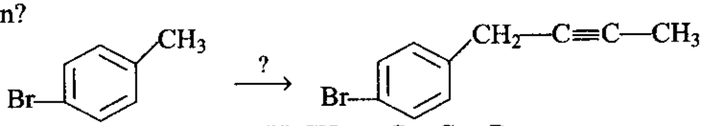
117. Which of the following heterocyclic compound would have aromatic character?

(a)  (b)  (c)  (d) 

118. Which of the following procedure would be the best for preparation of phenyl benzyl ether ($C_6H_5OCH_2C_6H_5$)?

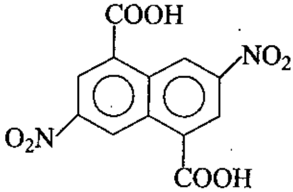
(a) $C_6H_5Cl + C_6H_5CH_2\overset{\ominus}{O}$ (b) $C_6H_5\overset{\ominus}{O} + C_6H_5CH_2—Cl$
(c) $2C_6H_5Cl + Na_2O$ (d) $2C_6H_5MgBr + HCHO$

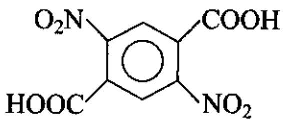
119. Which of the following procedures would be best for achieving for following reaction?

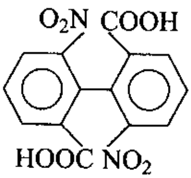


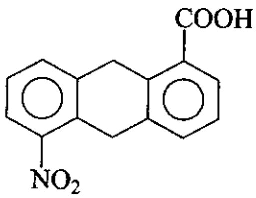
(a) (i) KOH and heat (ii) $CH_3—C\equiv C—Br$
(b) (i) $KMnO_4$ and heat (ii) $CH_3—C\equiv C^{\ominus}$ (iii) excess H_2O
(c) (i) NBS in CCl_4 and heat (ii) $CH_3—C\equiv C^{\ominus}$
(d) (i) Mg in ether (ii) $CH_3—C\equiv C^{\ominus}$ (iii) excess H_3PO_4

120. Which of the following carboxylic acid could be resolved reaction with an enantiomerically pure chiral amine?

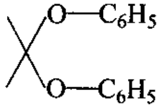
(a) 

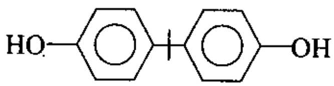
(b) 

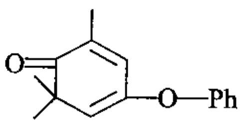
(c) 

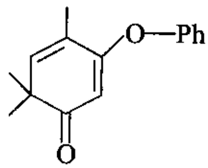
(d) 

121. Phenol reacts with acetone in the presence of conc. H_2SO_4 to form a $C_{15}H_{16}O_2$ product. Which of the following compound is this product?

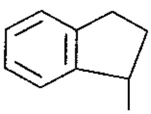
(a) 

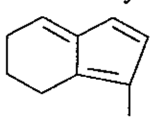
(b) 

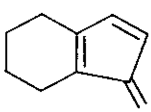
(c) 

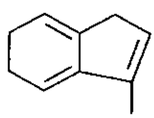
(d) 

122. Which of the following isomeric hydrocarbon is most acidic?

(a) 

(b) 

(c) 

(d) 

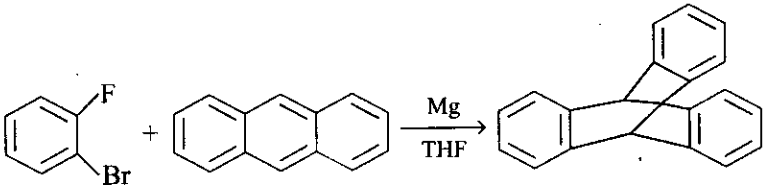
123. Devise a series of reaction to convert benzene into *meta*-chlorobromobenzene. Select reagent and condition from following table listing them in the order of use.

1. Conc. $H_2SO_4 \Delta$	2. $Cl_2 + FeCl_3$ and heat	3. $NaNO_2 + HCl\ 0°C$	4. H_2, Pt catalyst	5. Mg in ether
6. PBr_3	7. H_3PO_4	8. HNO_3 (Conc.) $+ H_2SO_4$ (Conc.)	9. $Cu_2Br_2 + HBr$	10. $(CH_3CO)_2O$ + Pyridine.

(a) 1 then 2 then 6
(b) 2 then 8 then 4 then 3 then 9
(c) 8 then 4 then 10 then 2 then 3 then 9
(d) 8 then 2 then 4 then 3 then 9

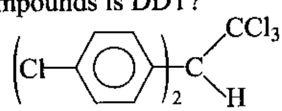
124. Iodination of benzene is not easily carried out. How can one prepare *para*-iodo benzoic acid from *p*-nitrotoluene?

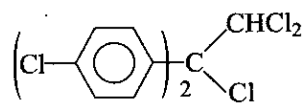
(a) (i) $Br_2 + FeBr_3$	(ii) Mg in ether, CO_2	(iii) $3H_2$ and Pt Catalyst	(iv) HNO_2 0°C	(v) KI solution
(b) (i) NBS in CCl_4 and Heat	(ii) NaI in acetone	(iii) $3H_2$ and Pt catalyst	(iv) HNO_2	(v) H_3PO_2
(c) (i) NBS in CCl_4 and Heat	(ii) HNO_2, 0°C	(iii) CuBr + HBr	(iv) $KMnO_4$, Δ	(v) KI solution
(d) (i) $KMnO_4$ and Heat	(ii) Sn + HCl	(iii) HNO_2, 0°C	(iv) KI solution	

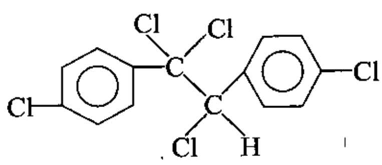
125. 

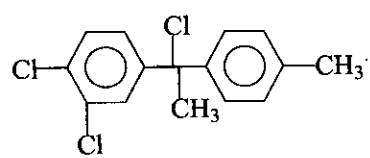
(a) Grignard reagent forms dihalobenzene, adds to anthracene, followed by nucleophilic displacement of flourides anion to form the product.
(b) Mg reduces anthracene to a reactive dianion that bonds to the dihalobenzene.
(c) A Grignard reagent forms the dihalobenzene, metalates the anthracene and this nucleophile adds to the remaining fluorobenzene.
(d) A Grignard reagent forms the dihalobenzene, decomposes to benzyne, which then cycloaldols to anthracene.

126. The insecticide DDT ($C_{14}H_9Cl_5$) is prepared by heating chlorobenzene with chloral (CCl_3CHO) in the presence of conc. H_2SO_4. Which of following compounds is DDT?

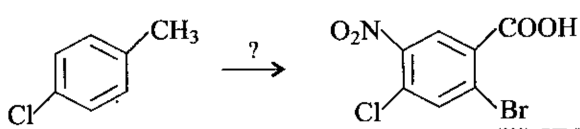
(a) 

(b) 

(c) 

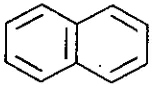
(d) 

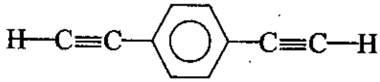
127. Which of the following procedure would be best for achieving the following reaction?

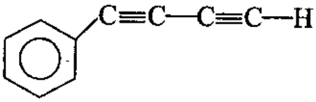


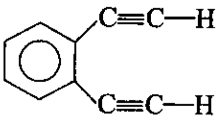
(a) (i) $Br_2 + FeBr_3$ (ii) $KMnO_4$ and Heat (iii) HNO_3 and H_2SO_4
(b) (i) $KMnO_4$ and Heat (ii) $Br_2 + FeBr_3$ (iii) HNO_3 and H_2SO_4
(c) (i) NBS in CCl_4 and Heat (ii) $KMnO_4$ and Heat (iii) HNO_3 and H_2SO_4
(d) (i) NBS in CCl_4 and Heat (ii) $NaNO_2$ (iii) $KMnO_4$ and Heat

128. Compound A ($C_{10}H_6$) liberate 2 mole of CH_4 when treated with MeMgBr. On heating with $KMnO_4$ solution, A produces benzene dicarboxylic acid which on mononitration produces only one product and no other isomers. 'A' can be :

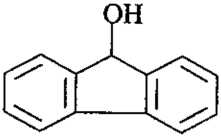
(a) 

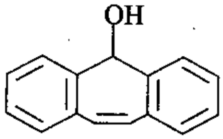
(b) 

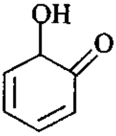
(c) 

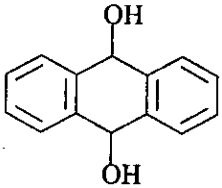
(d) 

129. Which of the following alcohols would you expect to form carbocation most readily in H_2SO_4?

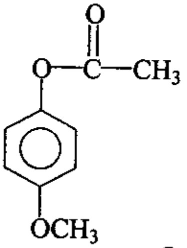
(a) 

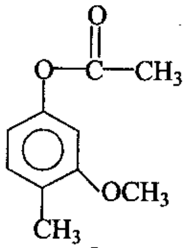
(b) 

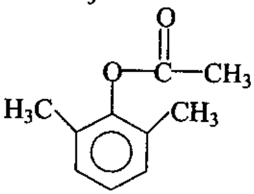
(c) 

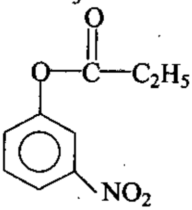
(d) 

130. Which of the following compounds will not rearrange on heating with $AlCl_3$?

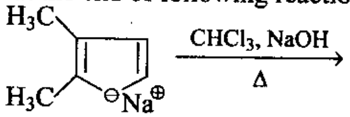
(a) 

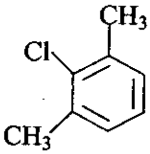
(b) 

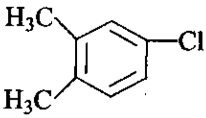
(c) 

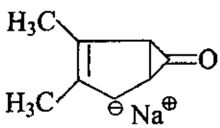
(d) 

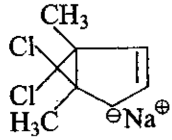
131. Which product is formed at the end of following reaction?



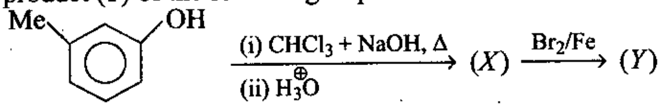
(a) 

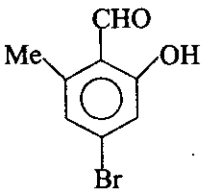
(b) 

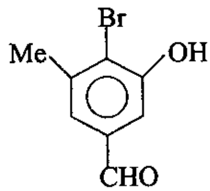
(c) 

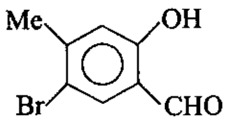
(d) 

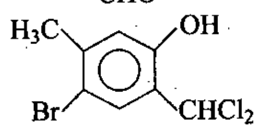
132. The product (Y) of the following sequence of reaction would be :



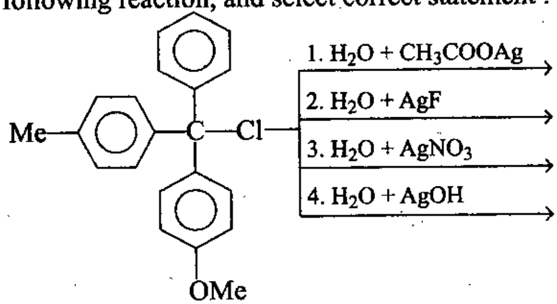
(a) 

(b) 

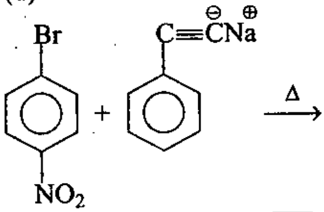
(c) 

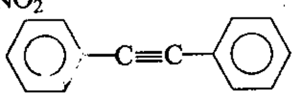
(d) 

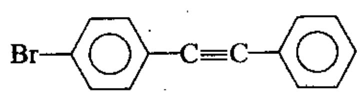
133. Consider the following reaction, and select correct statement :

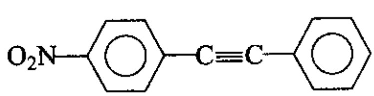


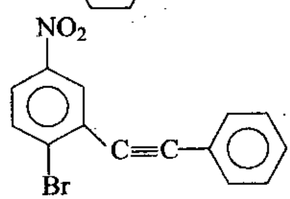
(a) only one product will be formed in each of these reaction.
(b) the rate of reaction remains the same in all the reactions.
(c) there will be 100% racemisation in all reactions.
(d) the rate of reaction will be twice in 2nd reaction if conc. AgF is doubled.

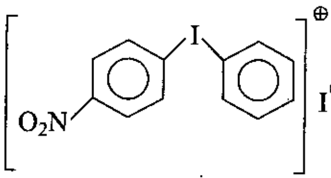
134.  (X). Find out correct product 'X' :

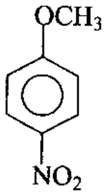
(a) 

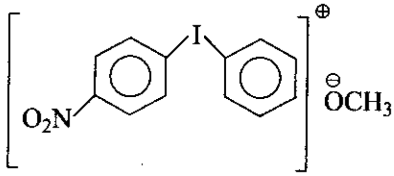
(b) 

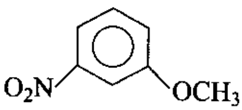
(c) 

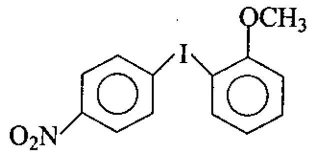
(d) 

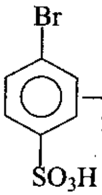
135.  $I^{\ominus}$ $\xrightarrow[\Delta]{CH_3O^{\ominus}Na^{\oplus}}$ Y. Find out correct product 'Y'.

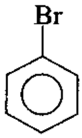
(a) 

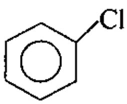
(b) 

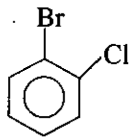
(c) 

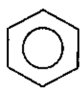
(d) 

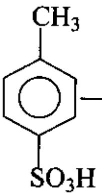
136.  $\xrightarrow[\text{2. } H^{\oplus}/H_2O]{\text{1. } Cl_2 + Fe, \Delta}$ Z. Find out correct product 'Z' :

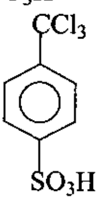
(a) 

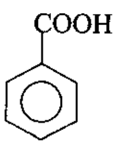
(b) 

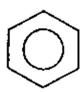
(c) 

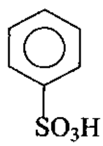
(d) 

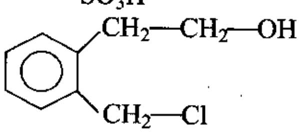
137.  $\xrightarrow[\text{excess}]{Cl_2/hv}$ A $\xrightarrow[\Delta,\ 1\text{ atm P}]{\text{1. } Na_2CO_3 \text{ aq.}}$ B; Identify B :
2. $H^{\oplus}/H_2O$

(a) 

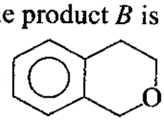
(b) 

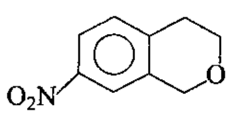
(c) 

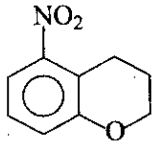
(d) 

138.  $\xrightarrow{\text{aq. KOH}}$ A $\xrightarrow{\Delta,\ \text{Cyclisation}}$ $\xrightarrow{HNO_3 + H_2SO_4}$ B

The product B is :

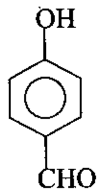
(a) 

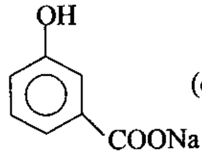
(b) 

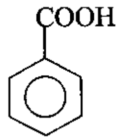
(c) 

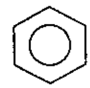
(d) none of these

139. An organic compound A on treatment with $CHCl_3$ and KOH gives B and C, both of which, in turn, give the same compound D when distilled with Zn dust. Oxidation of D yields E of the formula $C_7H_6O_2$. The Na salt of E on heating with soda lime give F which can also be obtained by distilling A with Zn dust. Identify F.

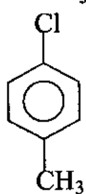
(a) 

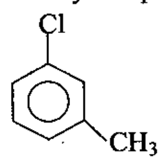
(b) 

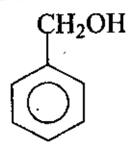
(c) 

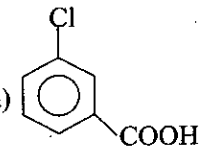
(d) 

140. Compound A (C_7H_7Cl) react with aq. KOH at room temperature and give compound D (C_7H_8O). Another isomer B gives only one mononitration product on treatment with $HNO_3 + H_2SO_4$ mixture. Isomer C give compound E ($C_7H_5O_2Cl$) on heating with $KMnO_4$ solution. E gives 3-chloro-4-nitrobenzoic acid as major product. Identify compound D.

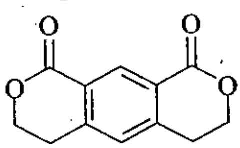
(a) 

(b) 

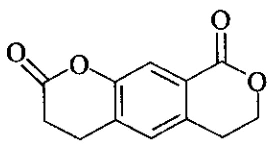
(c) 

(d) 

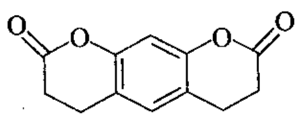
141. Arrange the following in decreasing order of reaction with $Cl_2/AlCl_3$:



(P)

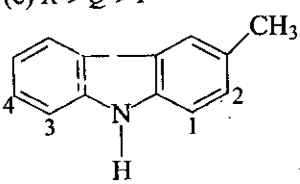


(Q)



(R)

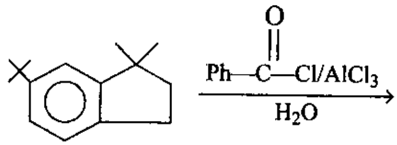
(a) $Q > R > P$
(b) $P > Q > R$
(c) $R > Q > P$
(d) $R > P > Q$

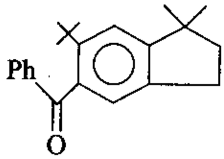
142. 

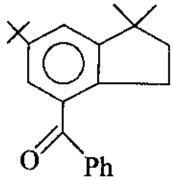
Identify the position where, EAS reaction can take place :

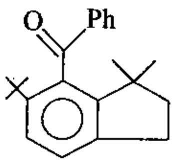
(a) 1
(b) 2
(c) 3
(d) 4

143. The major product of the reaction is :

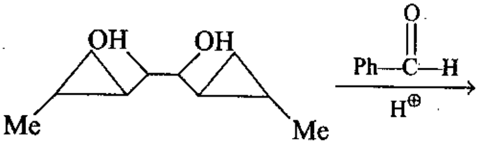
 Product :

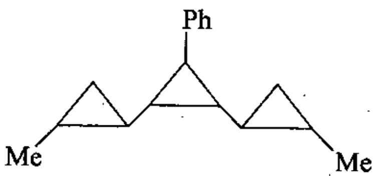
(a) 

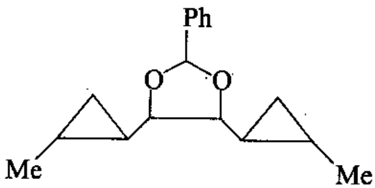
(b) 

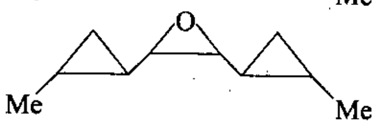
(c) 

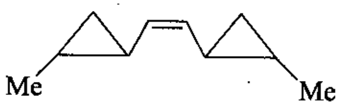
(d) none of these

144.  Product :

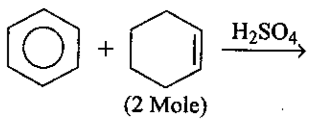
(a) 

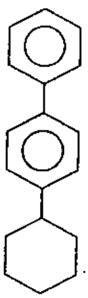
(b) 

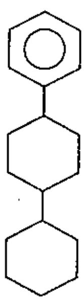
(c) 

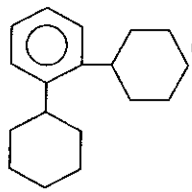
(d) 

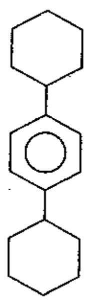
145. Major product obtained in given reaction

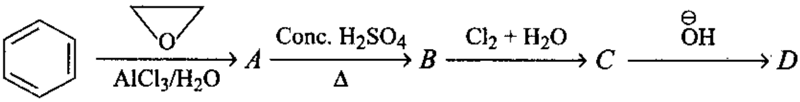
 is :

(a) 

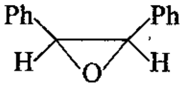
(b) 

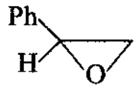
(c) 

(d) 

146. 

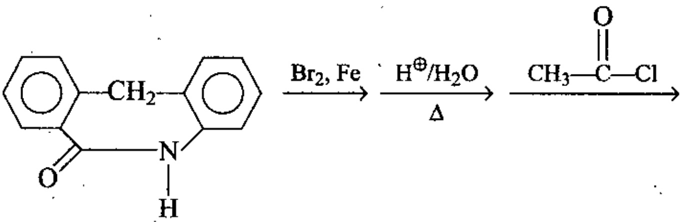
The product D is :

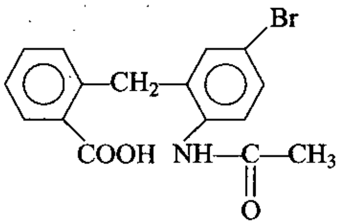
(a) 

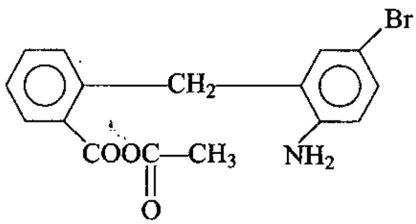
(b) 

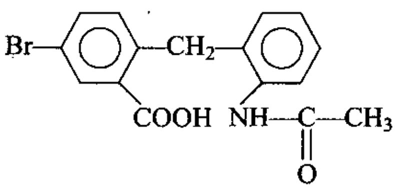
(c) $Ph{-}\overset{\overset{\large O}{||}}{C}{-}CH_3$

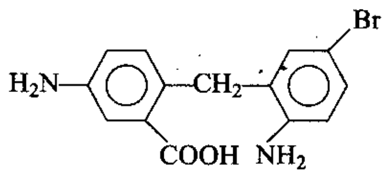
(d) $Ph{-}CH_2{-}\overset{\overset{\large O}{||}}{C}{-}H$

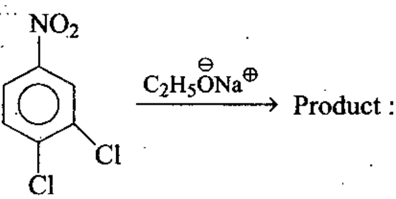
147.  Product is :

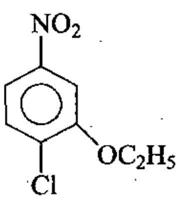
(a) 

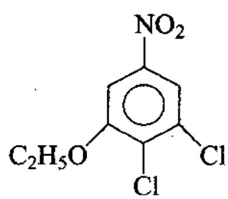
(b) 

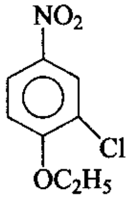
(c) 

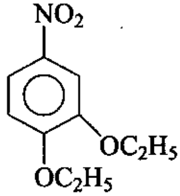
(d) 

148.  Product :

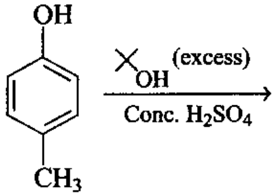
(a) 

(b) 

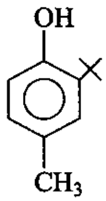
(c) 

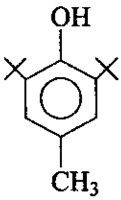
(d) 

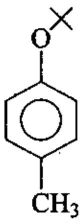
149. The product of following reaction

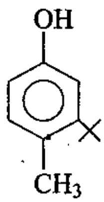


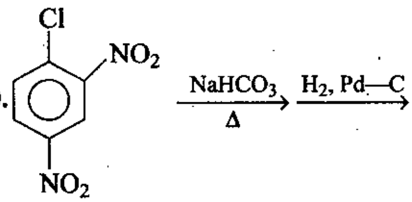
is :

(a) 

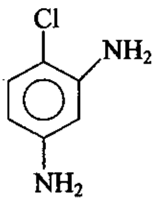
(b) 

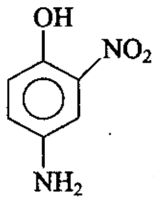
(c) 

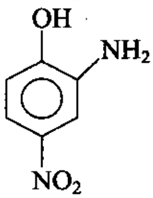
(d) 

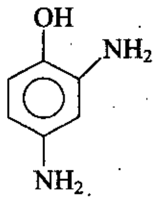
150. 

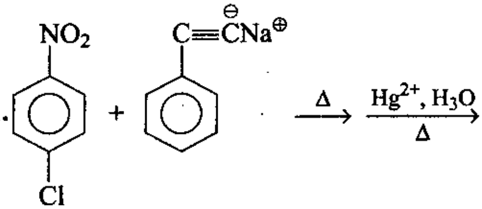
Product :

(a) 

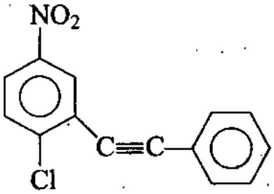
(b) 

(c) 

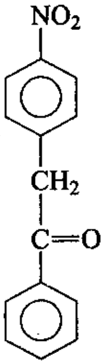
(d) 

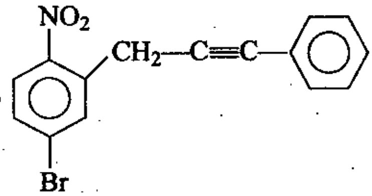
151. 

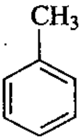
Product :

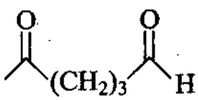
(a) 

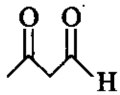
(b) 

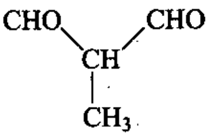
(c) 

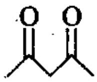
(d) 

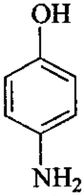
152.  $\xrightarrow{\text{Na, Liq. NH}_3}$ $\xrightarrow[\text{Me}_2\text{S}]{\text{O}_3}$ Product :

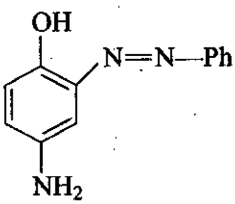
(a) 

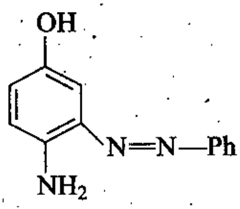
(b) 

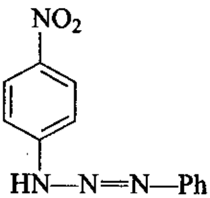
(c) 

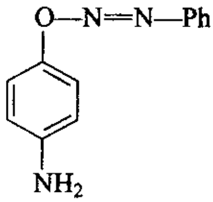
(d) 

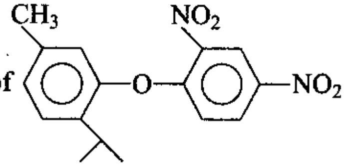
153.  + Ph—$\overset{\oplus}{N}$≡N$\overset{\ominus}{Cl}$ $\xrightarrow{\text{dil. NaOH}}$ Product :

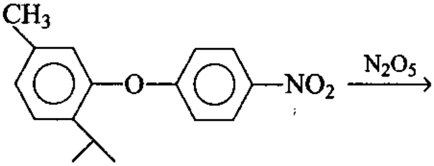
(a) 

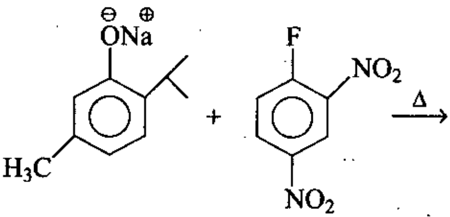
(b) 

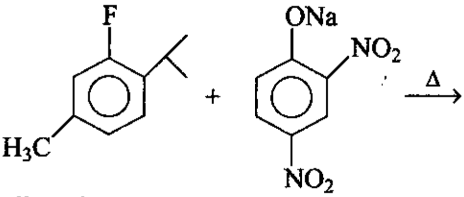
(c) 

(d) 

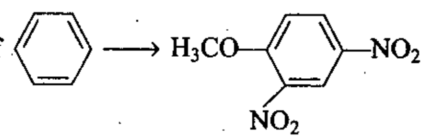
154. Which is the best synthesis of 

(a) 

(b) 

(c) 

(d) all are incorrect

155. Which is best synthesis of 

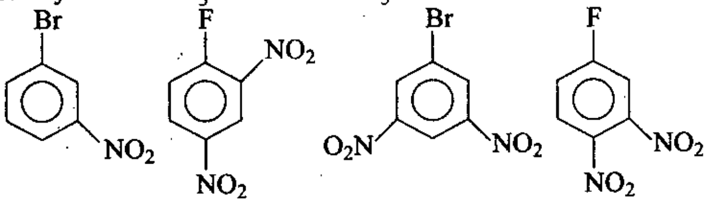
(a) $\xrightarrow[FeBr_3]{Br_2} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[CH_3OH]{CH_3\overset{\ominus}{O}\overset{\oplus}{Na}}$

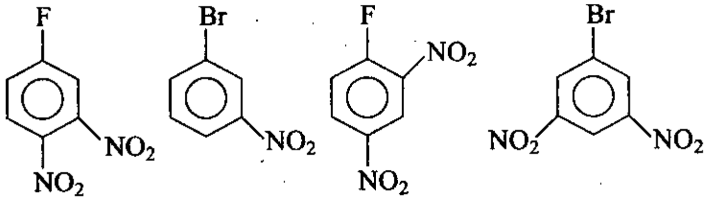
(b) $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[FeBr_3]{Br_2} \xrightarrow[CH_3OH]{CH_3\overset{\ominus}{O}\overset{\oplus}{Na}}$

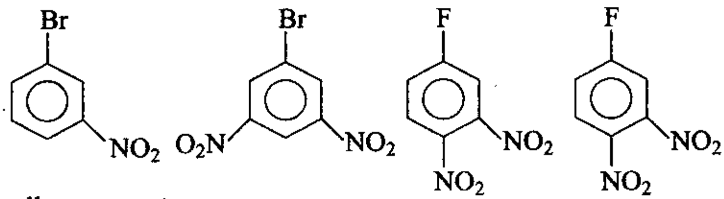
(c) $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[FeBr_3]{Br_2} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[CH_3OH]{CH_3\overset{\ominus}{O}\overset{\oplus}{Na}}$

(d) $\xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[FeBr_3]{Br_2} \xrightarrow[CH_3OH]{\overset{\oplus}{Na}\overset{\ominus}{O}CH_3} \xrightarrow[H_2SO_4]{HNO_3}$

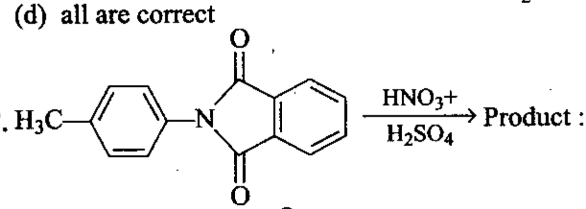
156. Which of the following correctly ranks the aryl halides in increasing order of reactivity toward $CH_3O^{\ominus}Na^{\oplus}$ in CH_3OH?

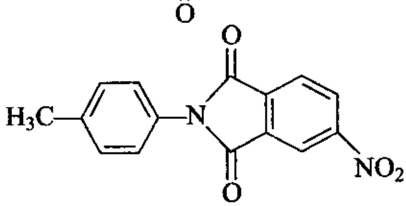
(a) 

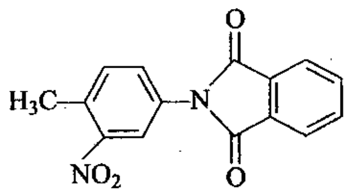
(b) 

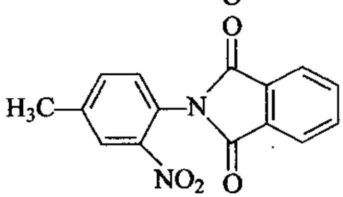
(c) 

(d) all are correct

157. 

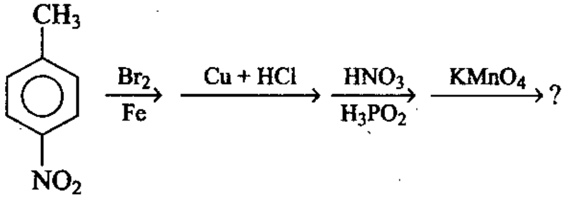
(a) 

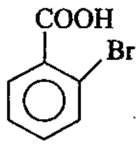
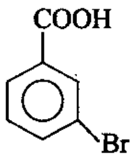
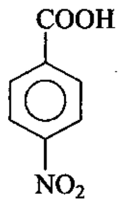
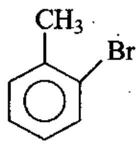
(b) 

(c) 

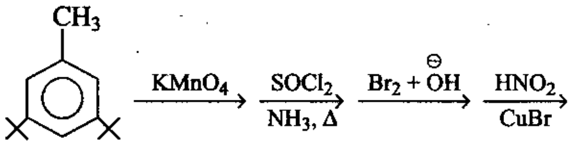
(d) no reaction

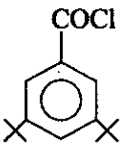
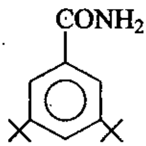
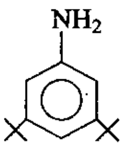
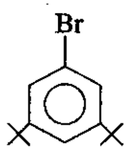
158. Find final product of the following reaction :



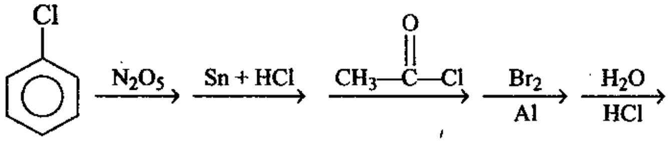
(a)  (b)  (c)  (d) 

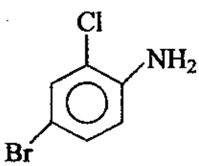
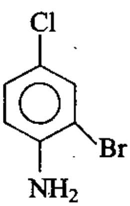
159. Find the final product of following sequence of reactions :

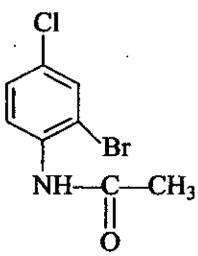
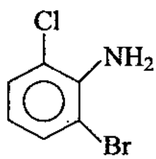


(a)  (b)  (c)  (d) 

160. Find the final product of following sequence of reactions :

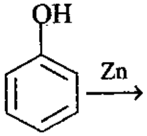


(a)  (b) 

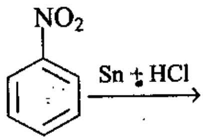
(c)  (d) 

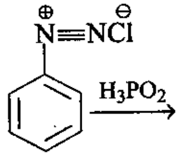
EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which of the following reactions will produce benzene?

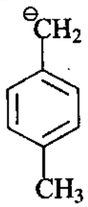
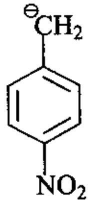
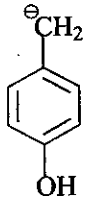
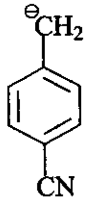
(a) 

(b) $3HC\equiv CH \xrightarrow[\Delta]{\text{Fe or Co}}$

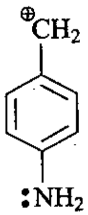
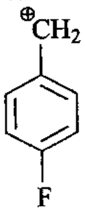
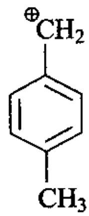
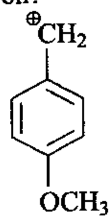
(c) 

(d) 

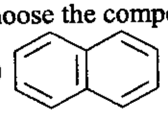
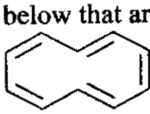
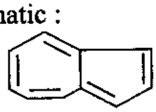
2. Which of the following anions are more stable than benzyl anion?

(a) 
(b) 
(c) 
(d) 

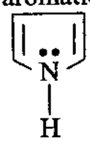
3. Which of the following cations are more stable than benzyl cation?

(a) 
(b) 
(c) 
(d) 

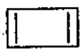
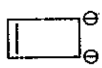
4. Choose the compounds below that are aromatic :

(a) 
(b) 
(c) 
(d) 

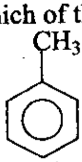
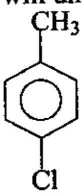
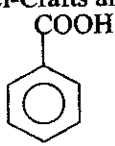
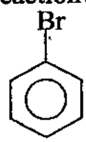
5. Choose the compounds below that are non aromatic :

(a) 
(b) 
(c) 
(d) 

6. Choose the compounds below that are antiaromatic :

(a) 
(b) 
(c) 
(d) 

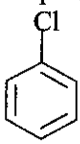
7. Which of the following will undergo Friedel-Crafts alkylation reaction?

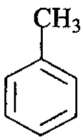
(a) 
(b) 
(c) 
(d) 

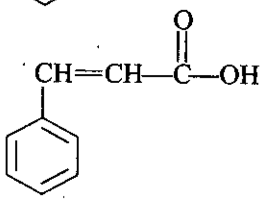
8. Which pairs are not required for a nucleophilic aromatic substitution reaction?
   (a) An —NO_2 substituent and a strong electrophile.
   (b) A ring bearing a strong activating group and a strong acid.
   (c) An aryl halide with an —NO_2 and a strong nucleophile.
   (d) An unsubstituted benzene ring and a strong electrophile.

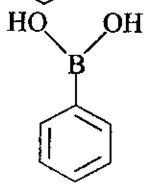
9. Halogens are deactivating yet *ortho, para* directing in electrophilic aromatic substitution. Which statements do not explain this?
   (a) A combination of inductive electron withdrawal and resonance electron release.
   (b) Inductive electron withdrawal with no resonance effect.
   (c) A combination of inductive electron release and resonance electron withdrawal.
   (d) A combination of inductive electron release and resonance electron release.

10. Which of the following are deactivating but *ortho*, *para* directing during electrophilic aromatic substitution reaction?

(a) 

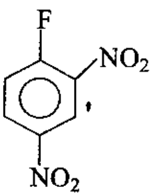
(b) 

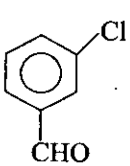
(c) 

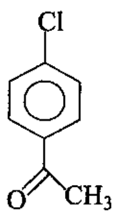
(d) 

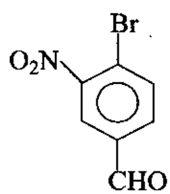
11. Choose the correct statements :
    (a) all activating groups are *ortho, para* directing.
    (b) all deactivating groups are *meta* directing.
    (c) directing nature of any group is decided by stability of sigma complex.
    (d) halogens are deactivating but *ortho, para* directing.

12. Identify the compounds that will undergo nucleophilic aromatic substitution reaction :

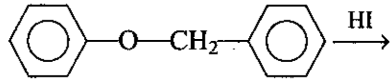
(a)  ,

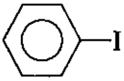
(b) 

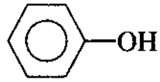
(c) 

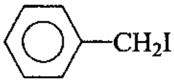
(d) 

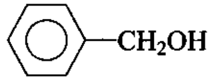
13. Find out correct statements regarding nucleophilic aromatic substitution reaction :
    (a) there should strong electron withdrawing group at *ortho* and *para* position with respect to leaving group.
    (b) nucleophilic atom should be of N, S, O, etc.
    (c) rate of reaction is fastest with fluoro derivative.
    (d) all are incorrect.

14. The reaction  produces :

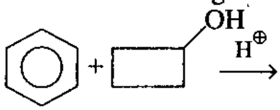
(a) 

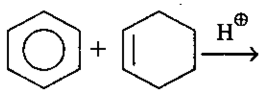
(b) 

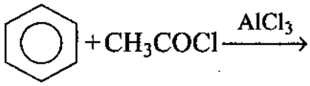
(c) 

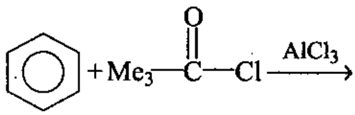
(d) 

15. Which of the following reactions give alkylation product?

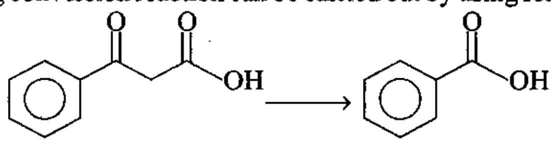
(a) 

(b) 

(c) 

(d) 

16. The following conversion reaction can be carried out by using reaction sequences :



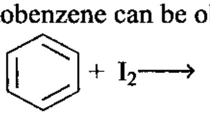
(a) $\xrightarrow{\text{Zn-Hg/HCl}} \xrightarrow{Br_2,\ h\nu} \xrightarrow{KCN} \xrightarrow{H_3^{\oplus}O,\ \Delta}$

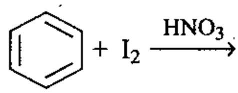
(b) $\xrightarrow{NaBH_4} \xrightarrow{Al_2O_3,\ \Delta} \xrightarrow{O_3/H_2O \text{ (Oxidation)}}$

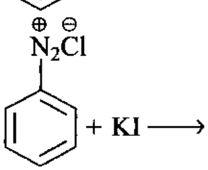
(c) $\xrightarrow{\Delta} \xrightarrow{I_2 + NaOH} \xrightarrow{H^{\oplus}}$

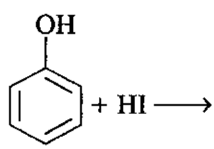
(d) $KMnO_4/\overset{\ominus}{O}H/\Delta$

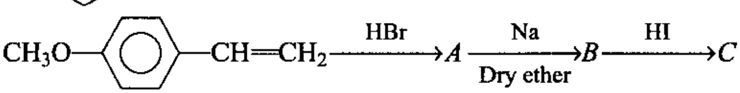
17. Iodobenzene can be obtained by :

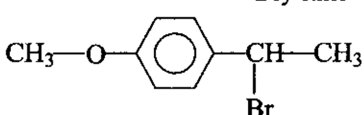
(a) 

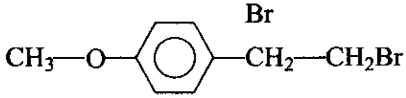
(b) 

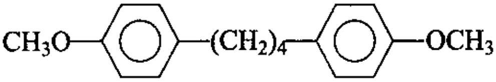
(c) 

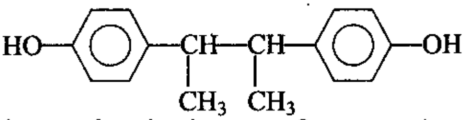
(d) 

18. 

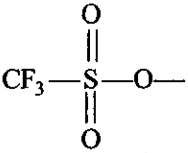
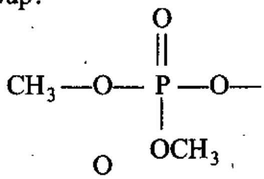
(a) Compound A is 

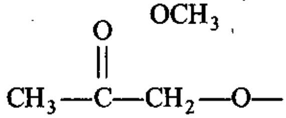
(b) Compound A is 

(c) Compound *B* is 

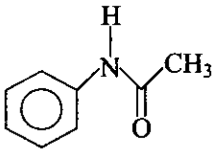
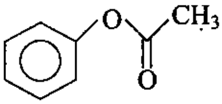
(d) Compound *C* is 

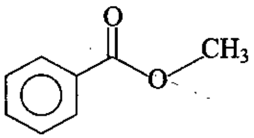
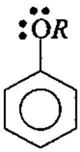
19. Which of the following are deactivating group?

(a) 
(b) 

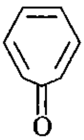
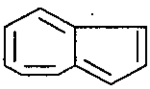
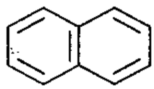
(c) CF_3
(d) 

20. Which of the following are more reactive than diphenyl in electrophilic aromatic substitution reaction?

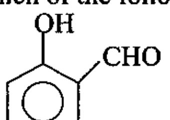
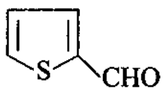
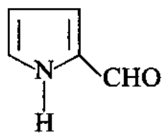
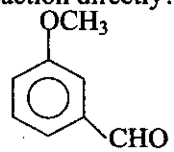
(a) 
(b) 

(c) 
(d) 

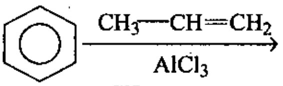
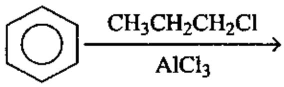
21. Dipole moment of which compound is not zero?

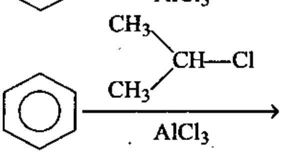
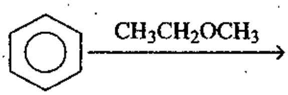
(a) 
(b) 
(c) 
(d) 

22. Which of the following can be prepared by Reimer-Tiemann reaction directly?

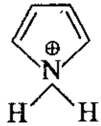
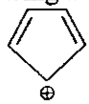
(a) 
(b) 
(c) 
(d) 

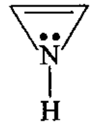
23. Isopropyl benzene can be obtained by :

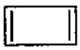
(a) 
(b) 

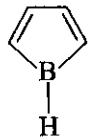
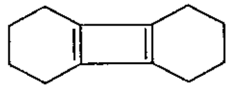
(c) 
(d) 

24. Which of the following are pairs of antiaromatic species?

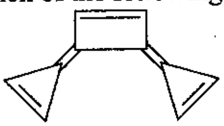
(a)  and 

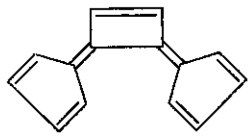
(b)  and 

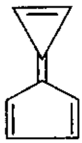
(c)  and 

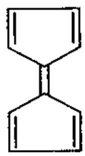
(d)  and 

25. Which of the following compounds are aromatic?

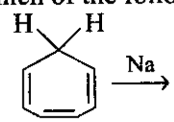
(a) 

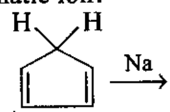
(b) 

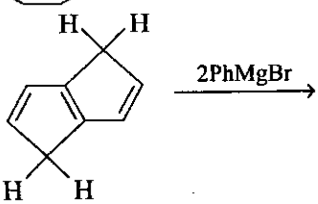
(c) 

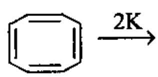
(d) 

26. Which of the following reactions give aromatic ion?

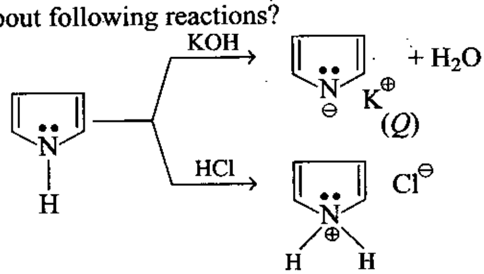
(a) 

(b) 

(c) 

(d) 

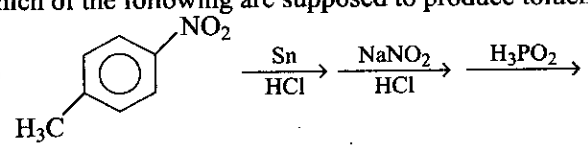
27. Which is true about following reactions?



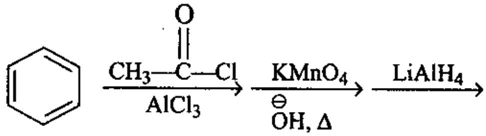
(P) (R)

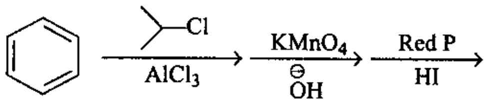
(a) P is aromatic
(b) Q is aromatic
(c) R is antiaromatic
(d) R is non aromatic

28. Which of the following are supposed to produce toluene?

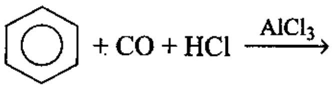
(a) 

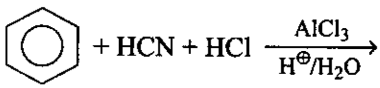
(b) 

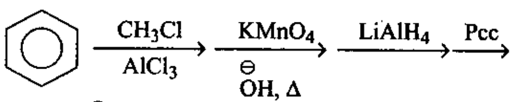
(c) 

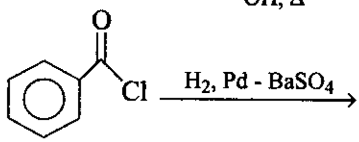
(d) 

29. Which of the following reactions may give benzaldehyde?

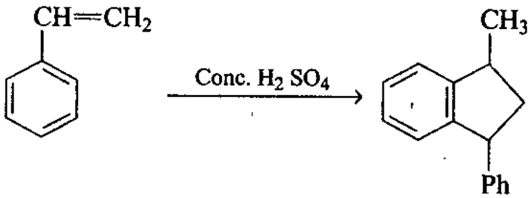
(a) 

(b) 

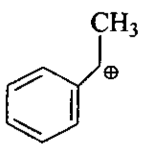
(c) 

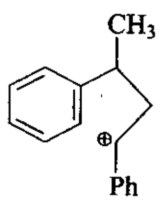
(d) 

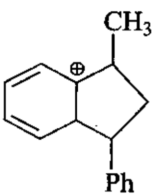
30. Styrene undergoes following reactions in acidic medium,

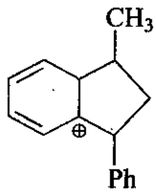


The various intermediate formed are :

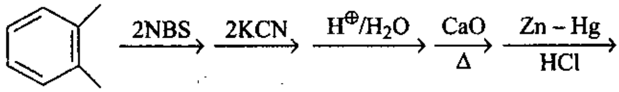
(a) 

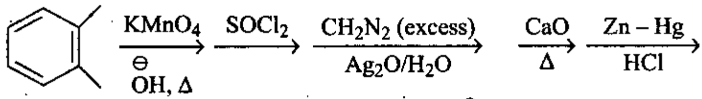
(b) 

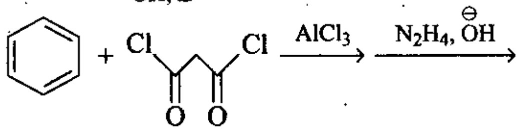
(c) 

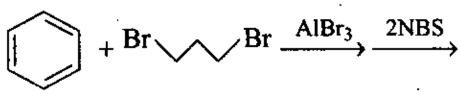
(d) 

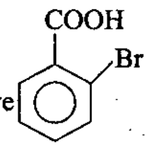
31. Which of the following reactions will give identical products?

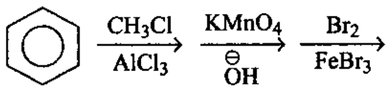
(a) 

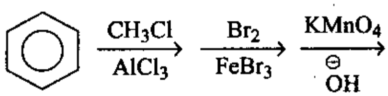
(b) 

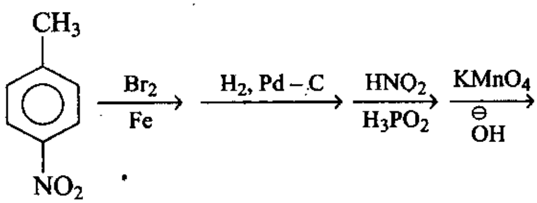
(c) 

(d) 

32. Which of the following sequence of reactions can give  ?

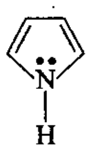
(a) 

(b) 

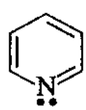
(c) 

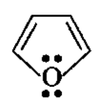
(d) PhMgBr $\xrightarrow[H^{\oplus}/H_2O]{CO_2}$ $\xrightarrow[AlBr_3]{Br_2}$

33. Which of the following compounds gives faster *EAS* reaction than benzene?

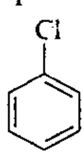
(a) 

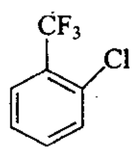
(b) 

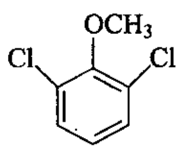
(c) 

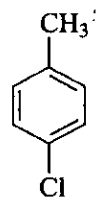
(d) 

34. Which of the compounds give cine substitution products on reaction with $NaNH_2$ in liquid NH_3?

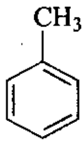
(a) 

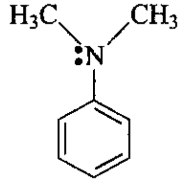
(b) 

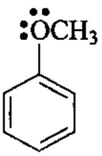
(c) 

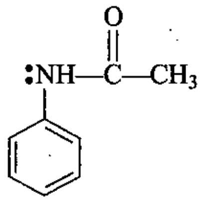
(d) 

35. Which of the following compounds can give coupling reaction with benzene diazonium salt?

(a) 

(b) 

(c) 

(d) 

EXERCISE-3 LINKED COMPREHENSION TYPE

Passage-1

For any compound to be aromatic, compound should follow a given set of rule known as Huckel's rule.

According to Huckel's rule of aromaticity :

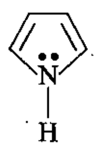
(a) compound should be cyclic

(b) compound should be planar and conjugated.

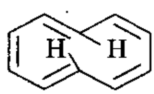
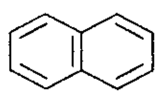
(c) compound should have $(4n+2)\ \pi e^-$

where $n = 0, 1, 2, 3$ ... integer number.

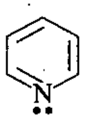
1. Which of the following is not an aromatic compound?

(a)  (b)  (c)  (d) 

2. Among the following which is a non planar compound?

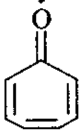
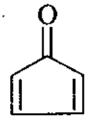
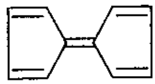
(a)  (b)  (c)  (d) 

3. Identify number of delocalised π-electron in pyridine :



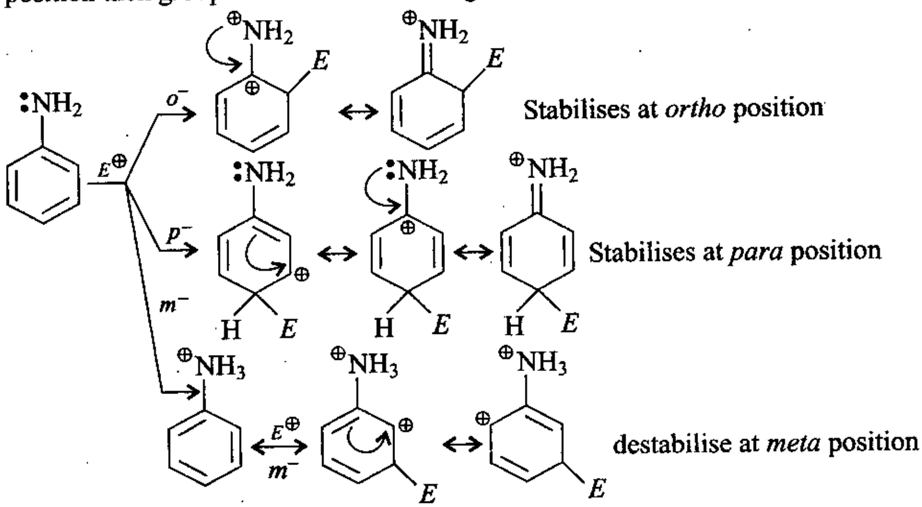
(a) 8 (b) 6 (c) 4 (d) 10

4. Identify the compound which have maximum dipole moment :

(a) 
(b) 
(c) 
(d) none of these

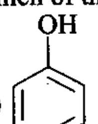
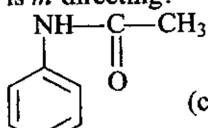
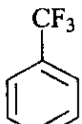
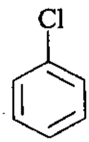
Passage-2

Directing nature of substituted aromatic compound is decided by stability of σ-complex or arenium ion. If σ-complex is stabilise at *o*-and *p*-position by attack of electrophile then the group is *o*-and *p*-directing but if σ-complex is stabilise at *m*-position then group will be *meta* directing.

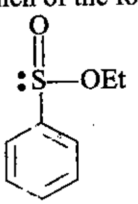
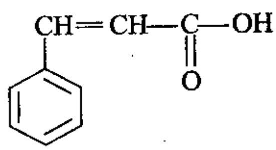
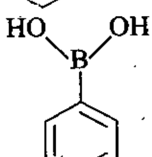
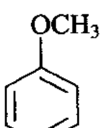


On the basis of above explanation find out correct answers of following questions.

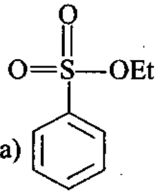
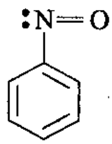
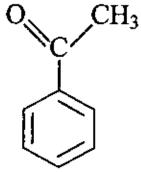
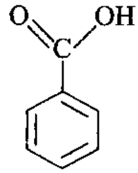
5. Which of the following is *m*-directing?

(a) 
(b) 
(c) 
(d) 

6. Which of the following is not *o*-and *p*-directing?

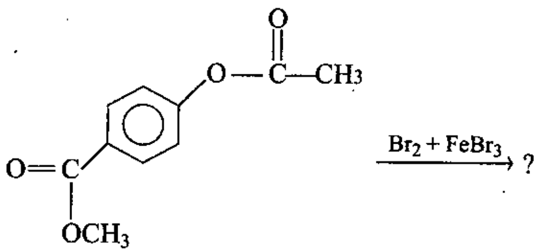
(a) 
(b) 
(c) 
(d) 

7. Which of the following is *o*- and *p*-directing?

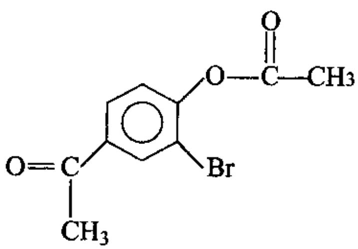
(a)  (b)  (c)  (d) 

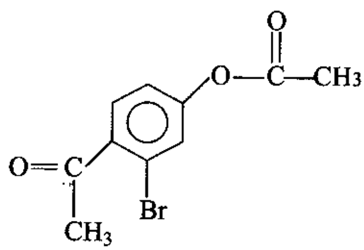
Passage-3

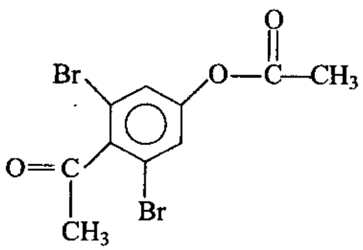
If aromatic ring is substituted by more than groups then electrophilic aromatic substitution reaction take place according to more activating group. Types of group which donate electron in aromatic ring known as activating groups.

8. 

Find out correct product of reaction.

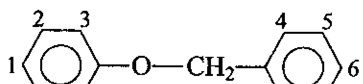
(a) 

(b) 

(c) 

(d) No reaction

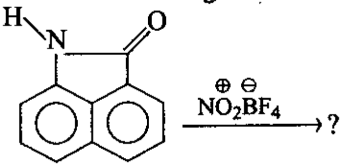
9. Major product formation take place at which position in this reaction :

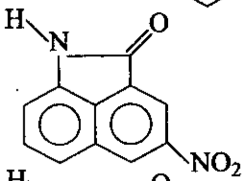


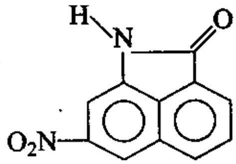
(a) 3 (b) 1

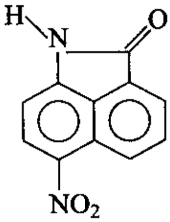
(c) 6 (d) 4

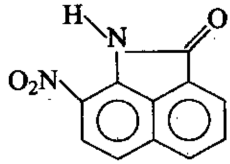
10. Find out major product of following reaction :



(a) 

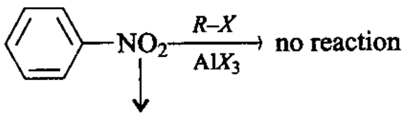
(b) 

(c) 

(d) 

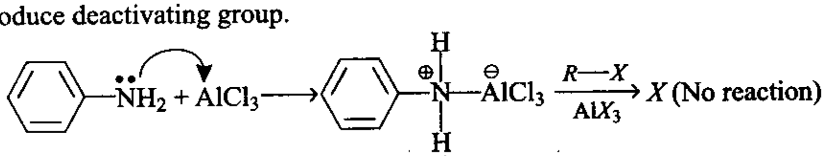
Passage-4

A benzene ring deactivated by strong and moderate electron withdrawing group that is, any *meta* directing group, is not electron rich enough to undergo Friedel-Crafts reactions.



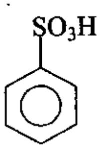
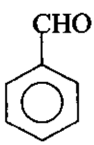
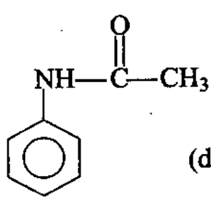
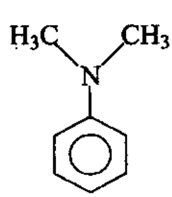
Strong deactivation

Friedel-Crafts reaction also do not occur with NH_2 group as it react with $AlCl_3$ and produce deactivating group.

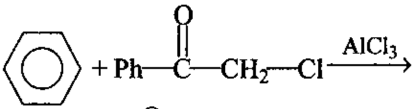


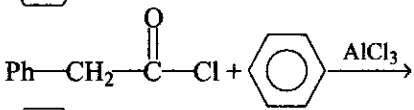
Deactivating group

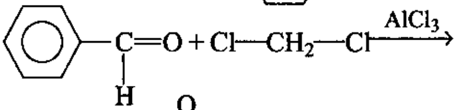
11. Which of the following compounds undergo Friedel-Crafts alkylation reaction?

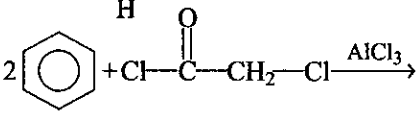
(a) 
(b) 
(c) 
(d) 

12. Which of the following cannot be starting material for this compound $Ph-\underset{\underset{O}{\|}}{C}-CH_2-Ph$?

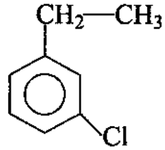
(a) 

(b) 

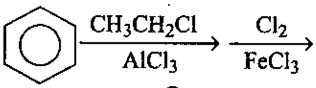
(c) 

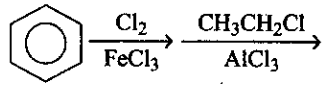
(d) 

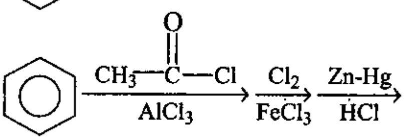
13. Which of the following sequence of reaction is correct for the synthesis of product



?

(a) 

(b) 

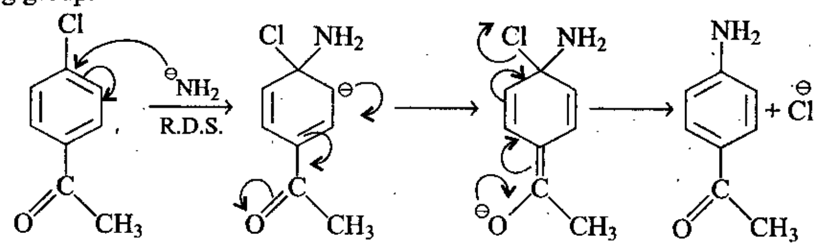
(c) 

(d) All are incorrect

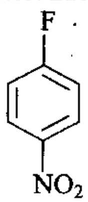
Passage-5

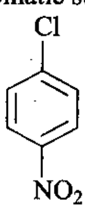
For a typical nucleophilic aromatic substitution reaction to take place.

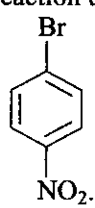
1. Nucleophilic atom should be of oxygen, nitrogen or sulphur.
2. Leaving groups should be halide.
3. There should be strong electron withdrawing at *ortho* and *para* position to leaving group.

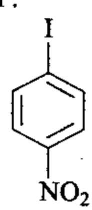


14. Fastest nucleophilic aromatic substitution reaction take place in :

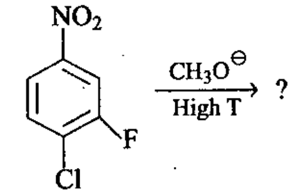
(a) 

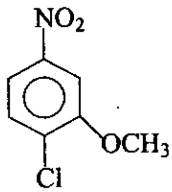
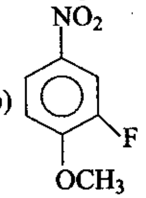
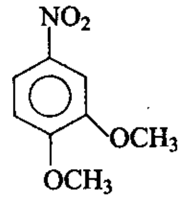
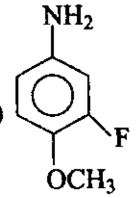
(b) 

(c) 

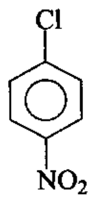
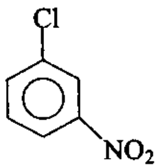
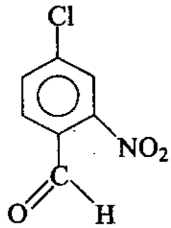
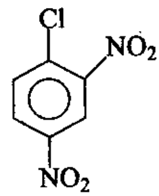
(d) 

15. Find out correct product of following reaction :



(a)  (b)  (c)  (d) 

16. Compare rate of nucleophilic aromatic substitution reaction in following reactants :

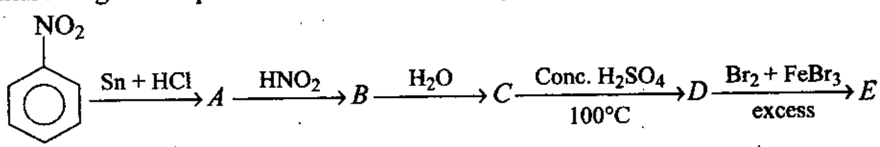
   

(P) (Q) (R) (S)

(a) $S > Q > P > R$
(b) $R > S > P > Q$
(c) $S > R > P > Q$
(d) $P > S > R > Q$

Passage-6

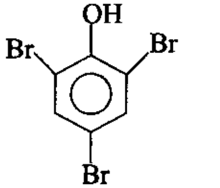
Examine given sequence of reactions carefully :

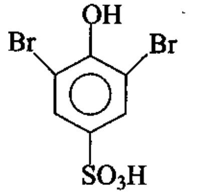


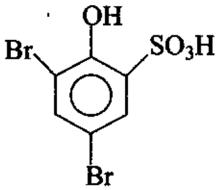
17. Conversion of B to C is which type of reaction?
(a) electrophilic aromatic substitution reaction
(b) nucleophilic aromatic substitution reaction
(c) free radical substitution
(d) nucleophilic acyl substitution reaction

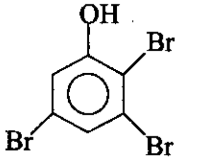
18. Formation of A from nitrobenzene cannot be achieved from :
(a) Zn + HCl
(b) Fe + HCl
(c) $NaBH_4$
(d) $LiAlH_4$

19. Identify product *E* of the reaction :

(a) 

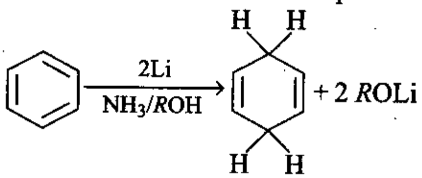
(b) 

(c) 

(d) 

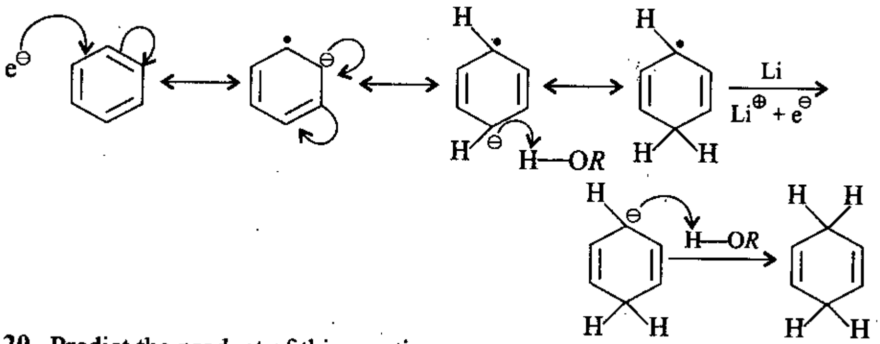
Passage-7

There is a way to reduce benzene derivatives to the corresponding 1, 4-cyclohexadiene known as Birch reduction. It involves treatment of aromatic substrate with two mole of active metal as Li or Na in liquid ammonia/alcohol mixture.

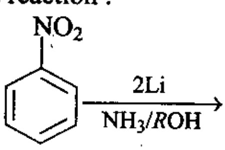


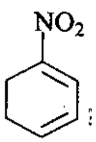
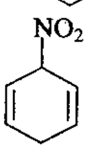
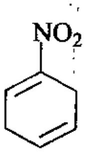
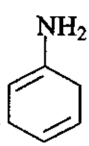
Mechanism :

$$\text{Li} \longrightarrow \text{Li}^{\oplus} + e^{-}$$

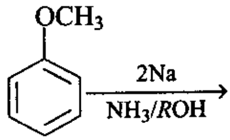


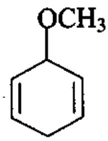
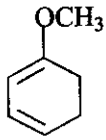
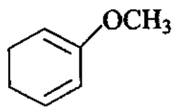
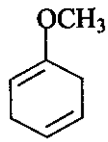
20. Predict the product of this reaction :



(a) 
(b) 
(c) 
(d) 

21. Find out correct product of the given reaction :

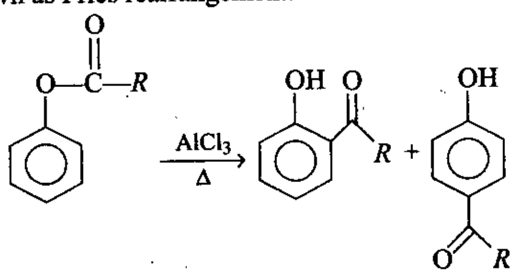


(a)  (b)  (c)  (d) 

22. Why alcohol, rather than ammonia, the proton source during the Birch reduction?
   (a) Alcohol is more acidic than ammonia.
   (b) Ammonia and alcohol both have nearly some acidic strength.
   (c) Ammonia is more acidic than alcohol.
   (d) All are incorrect.

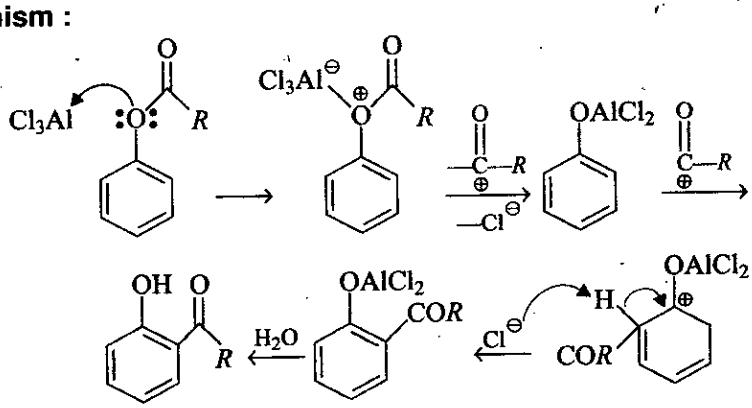
Passage 8.

Phenolic esters on heating with $AlCl_3$ (Lewis acid) give *ortho* and *para* acyl phenol. This is known as Fries rearrangement.

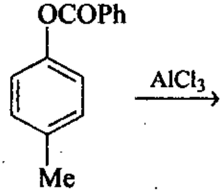


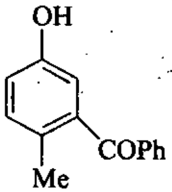
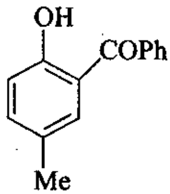
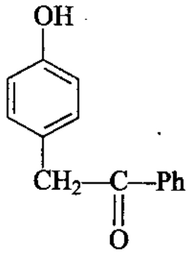
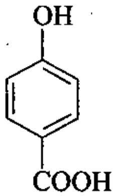
In general, low temperature favours the *para* product and high temperature favours *ortho* product.

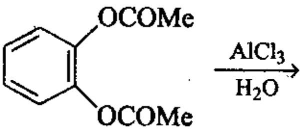
Mechanism :

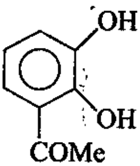
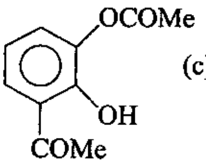
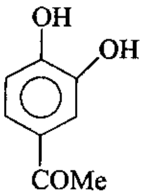
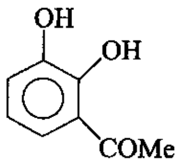


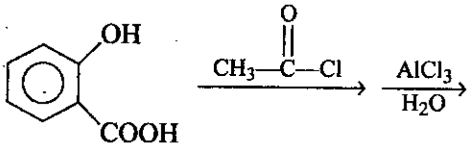
If one of the *ortho* position is substituted by any group then *para* is the major product.

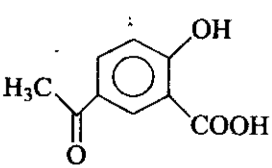
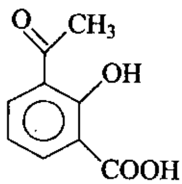
23.  Major product :

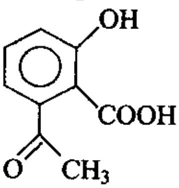
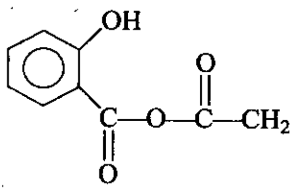
(a)  (b)  (c)  (d) 

24.  Major product :

(a)  (b)  (c)  (d) 

25. 

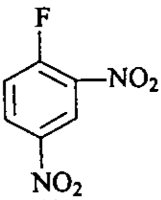
(a)  (b) 

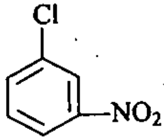
(c)  (d) 

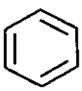
EXERCISE-4 MATRIX MATCH TYPE

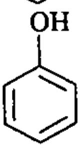
Column matching problems. Each column may have more than one answer.

1. **Column (I)** | **Column (II)**

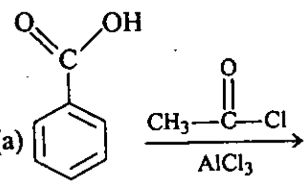
(a)  + $CH_3O^{\ominus}$ — *P*. Electrophilic aromatic substitution

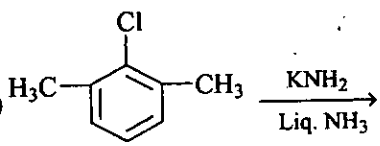
(b)  + KNH_2 in liq. NH_3 — *Q*. Reimer Tiemann reaction

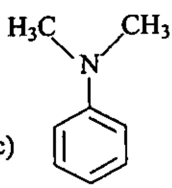
(c)  + N_2O_5 — *R*. Nucleophilic aromatic substitution

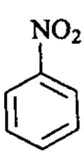
(d)  + $CHCl_3$ + KOH — *S*. Cine substitution reaction

2. **Column (I)** | **Column (II)**

(a)  — *P*. *o*, *p*-directing compound

(b)  — *Q*. Activated compound

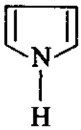
(c)  — *R*. No reaction

(d)  — *S*. Deactivated compound

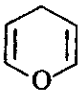
3. Column (I) | **Column (II)**

(a) 

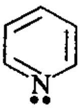
P. Aromatic

(b) 

Q. Non aromatic

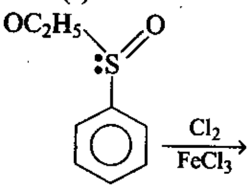
(c) 

R. Tub shape structure

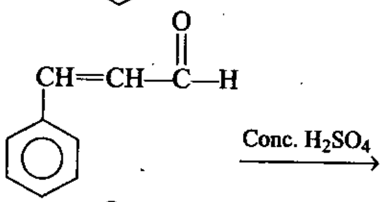
(d) 

S. Electrophilic aromatic substitution reaction

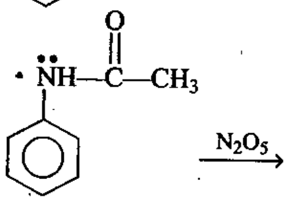
4. Column (I) | **Column (II)**

(a) 

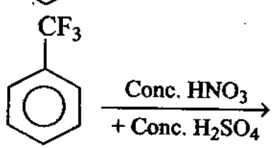
P. *Ortho* and *para* substitution.

(b) 

Q. *Meta* substitution.

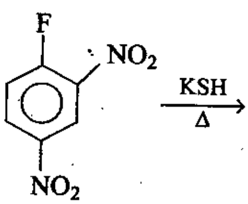
(c) 

R. Substitution is faster than benzene.

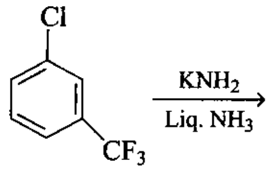
(d) 

S. Substitution is slower than benzene.

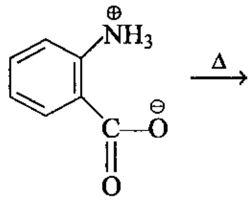
5. Column (I) | **Column (II)**

(a) 

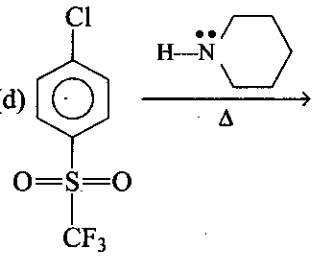
P. Nucleophilic aromatic substitution

(b) 

Q. Addition elimination reaction.

(c) 

R. Elimination addition reaction.

(d) 

S. Benzyne intermediate.

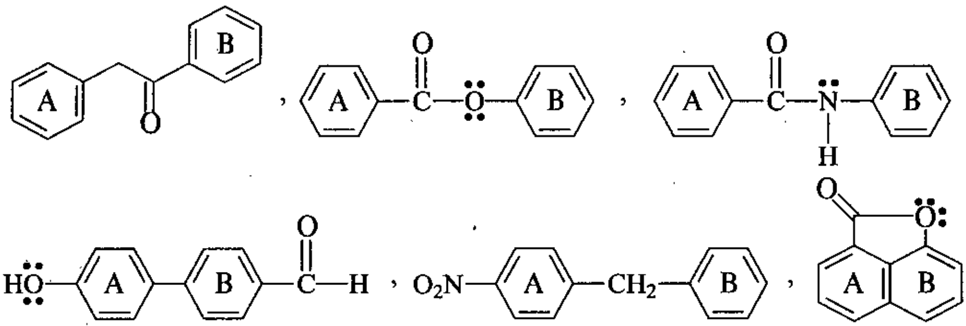
EXERCISE-5 INTEGER ANSWER TYPE PROBLEMS

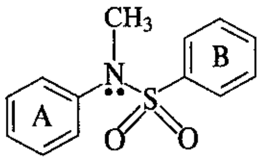
1. Identify number of substituents those are deactivating but *ortho* and *para* directing.

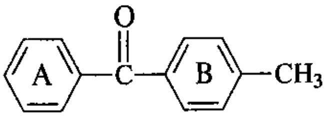
$-\ddot{\underset{\cdot\cdot}{F}}:$, $-CF_3$, $-\overset{O}{\overset{\|}{C}}-NH_2$, $-CH=CH-\overset{O}{\overset{\|}{C}}-H$, $-CH=CH-\overset{O}{\overset{\|}{C}}-OH$,

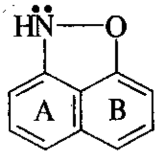
$-\underset{\cdot\cdot}{\overset{O}{\overset{\|}{S}}}-C_2H_5$, $-\underset{O}{\underset{\|}{\overset{O}{\overset{\|}{S}}}}-C_2H_5$, $-\ddot{N}=O$, $-\overset{O}{\overset{\|}{C}}-NH_2$

2. Each of the compounds shown below has two aromatic ring, labled as A and . Identify number of compounds in which ring B is more active than ring A for electrophilic aromatic substitution reaction.

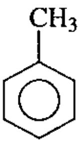
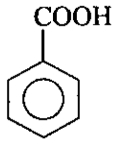
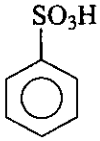
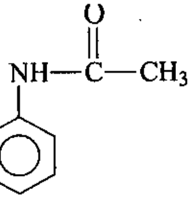
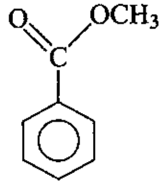


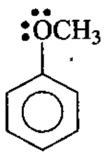
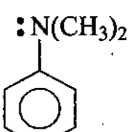
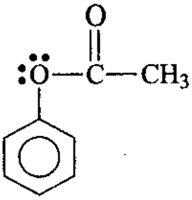
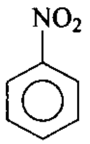
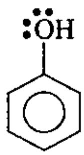


,


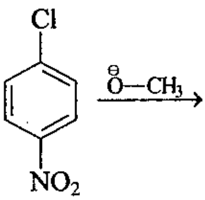
,


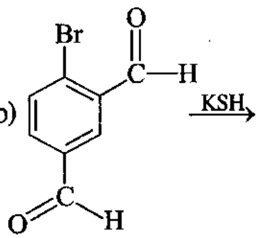
3. Examine the structural formulas shown below and find out how many compounds undergo electrophilic nitration more rapidly than flouro benzene.

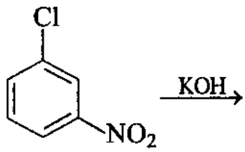
, , , , 

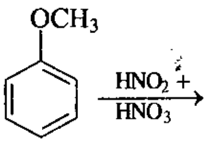
, , , , 

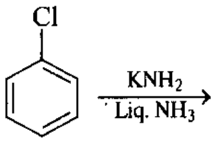
4. Identify number of reactions that can give nucleophilic aromatic substitution products.

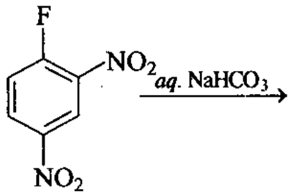
(a) 

(b) 

(c) 

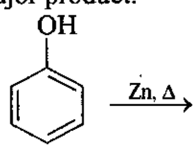
(d) 

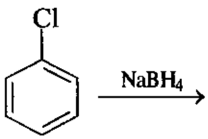
(e) 

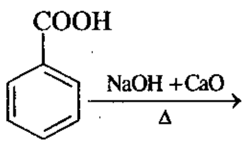
(f) 

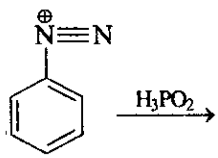
5. Identify number of reactions that can give benzene as major product.

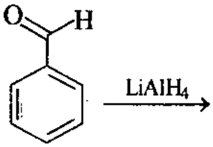
(a) $3\ H—C{\equiv}C—H \xrightarrow[\Delta]{\text{Fe or CO}}$

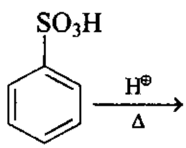
(b) 

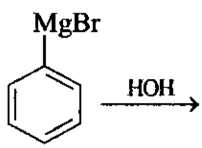
(c) 

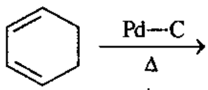
(d) 

(e) 

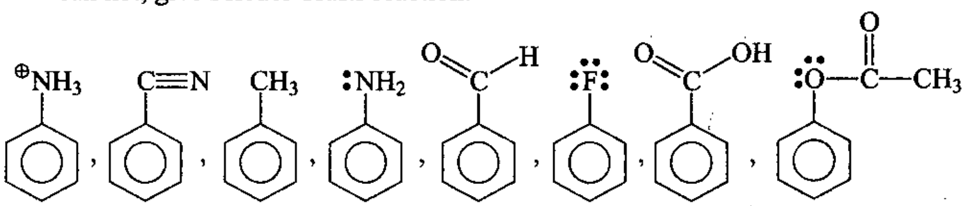
(f) 

(g) 

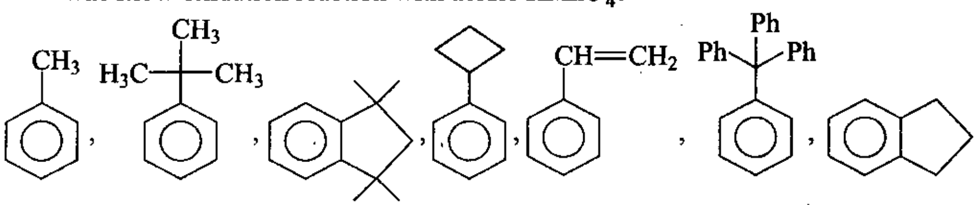
(h) 

(i) 

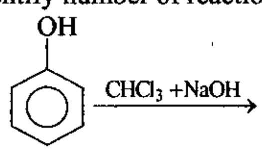
6. Examine the structural formulas shown below and find out how many compounds can not, give Friedel Crafts reaction.

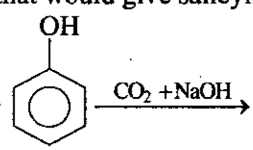


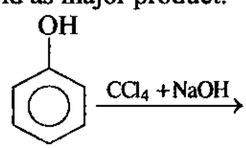
7. Examine the structural formulas shown below and find out how many compounds will show oxidation reaction with acidic KMnO$_4$.

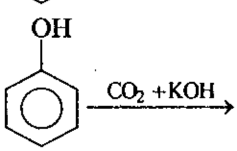


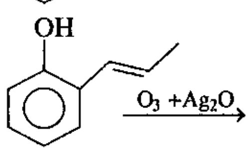
8. Identify number of reactions that would give salicylic acid as major product.

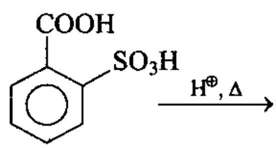
(a) 

(b) 

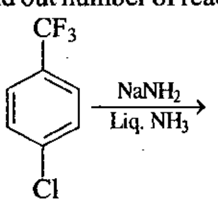
(c) 

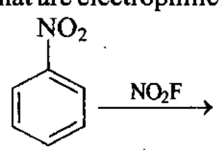
(d) 

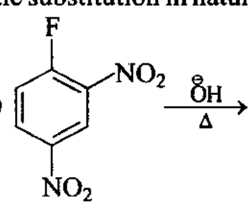
(e) 

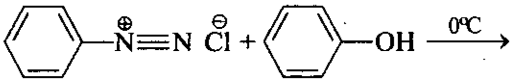
(f) 

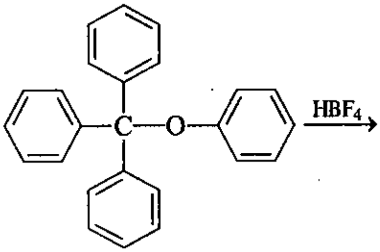
9. Find out number of reactions that are electrophilic aromatic substitution in nature.

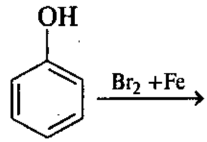
(a) 

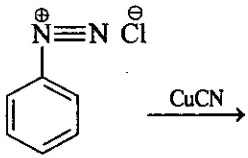
(b) 

(c) 

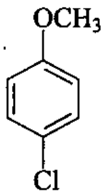
(d) 

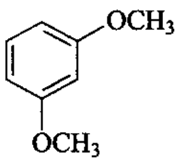
(e) 

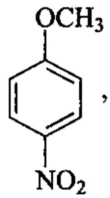
(f) 

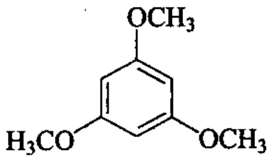
(g) 

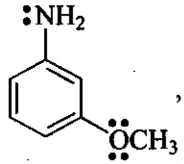
10. Examine the structural formulas shown below and identify how many compounds will show coupling reaction with diazonium salts faster than anisole ($Ph-\ddot{O}-CH_3$).

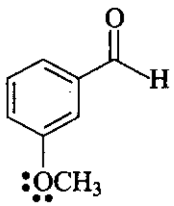


, 

, 

, 

, 

, 

ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (b)	2. (c)	3. (c)	4. (d)	5. (c)	6. (b)	7. (b)	8. (a)	9. (a)	10. (b)
11. (c)	12. (c)	13. (b)	14. (a)	15. (b)	16. (b)	17. (c)	18. (d)	19. (b)	20. (a)
21. (c)	22. (c)	23. (a)	24. (a)	25. (b)	26. (d)	27. (b)	28. (c)	29. (b)	30. (c)
31. (a)	32. (c)	33. (b)	34. (b)	35. (b)	36. (a)	37. (d)	38. (a)	39. (b)	40. (a,b)
41. (b)	42. (b)	43. (a)	44. (c)	45. (c)	46. (c)	47. (c)	48. (b)	49. (d)	50. (c)

Level-2

1. (a)	2. (c)	3. (b)	4. (a)	5. (c)	6. (b)	7. (b)	8. (c)	9. (a)	10. (c)
11. (c)	12. (b)	13. (b)	14. (c)	15. (c)	16. (d)	17. (c)	18. (c)	19. (c)	20. (d)
21. (b)	22. (b)	23. (c)	24. (a)	25. (c)	26. (b)	27. (b)	28. (b)	29. (b)	30. (c)
31. (d)	32. (b)	33. (c)	34. (c)	35. (b)	36. (c)	37. (b)	38. (a)	39. (c)	40. (b)
41. (b)	42. (b)	43. (c)	44. (d)	45. (d)	46. (c)	47. (a)	48. (a)	49. (c)	50. (b)

Level-3

1. (d)	2. (a)	3. (b)	4. (b)	5. (c)	6. (d)	7. (a)	8. (c)	9. (b)	10. (b)
11. (b)	12. (b)	13. (d)	14. (c)	15. (b)	16. (c)	17. (d)	18. (a)	19. (c)	20. (c)
21. (d)	22. (a)	23. (a)	24. (c)	25. (b)	26. (d)	27. (d)	28. (d)	29. (a)	30. (d)
31. (d)	32. (d)	33. (b)	34. (b)	35. (b)	36. (a)	37. (c)	38. (c)	39. (a)	40 (a)
41. (b)	42. (d)	43. (c)	44. (c)	45. (c)	46. (a)	47. (c)	48. (a)	49. (a)	50. (d)
51. (a)	52. (a)	53. (d)	54. (c)	55. (d)	56. (d)	57. (a)	58. (a)	59. (b)	60. (c)
61. (d)	62. (a)	63. (d)	64. (b)	65. (c)	66. (d)	67. (a)	68. (b)	69. (d)	70. (a)
71. (b)	72. (a)	73. (b)	74. (c)	75. (b)	76. (a)	77. (c)	78. (b)	79. (b)	80. (c)
81. (d)	82. (d)	83. (d)	84. (c)	85. (a)	86. (d)	87. (c)	88. (d)	89. (c)	90. (b)
91. (c)	92. (d)	93. (d)	94. (c)	95. (d)	96. (a)	97. (c)	98. (a)	99. (d)	100. (a)
101. (a)	102. (a)	103. (c)	104. (d)	105. (d)	106. (b)	107. (b)	108. (c)	109. (b)	110. (c)
111. (c)	112. (b)	113. (a)	114. (d)	115. (c)	116. (b)	117. (d)	118. (b)	119. (c)	120. (c)
121. (b)	122. (d)	123. (d)	124. (d)	125. (d)	126. (a)	127. (a)	128. (b)	129. (b)	130. (d)
131. (a)	132. (c)	133. (b)	134. (c)	135. (a)	136. (c)	137. (b)	138. (b)	139. (d)	140. (c)
141. (c)	142. (a)	143. (b)	144. (b)	145. (d)	146. (b)	147. (a)	148. (c)	149. (b)	150. (d)
151. (c)	152. (b)	153. (a)	154. (b)	155. (a)	156. (c)	157. (b)	158. (a)	159. (d)	160. (b)

Exercise-2 : More Than One Correct Answers

1. (a, b, d)	2. (b, d)	3. (a, c, d)	4. (a, c, d)	5. (a, b, d)	6. (a, b, c)
7. (a, b, c)	8. (a, b, d)	9. (a, c, d)	10. (a, c)	11. (a, c, d)	12. (a, c, d)
13. (a, b, c)	14. (b, c)	15. (a, c, d)	16. (b, c, d)	17. (b, c)	18. (a, d)
19. (a, b, c)	20. (a, b, d)	21. (a, c)	22. (a, b, c)	23. (a, b, c)	24. (b, d)
25. (a, b, c)	26. (b, c, d)	27. (a, b, d)	28. (a, b, d)	29. (a, b, c, d)	30. (a, b, c)
31. (a, b, c)	32. (b, c)	33. (a, b, d)	34. (a, b, d)	35. (b, c)	

Exercise-3 : Linked Comprehension Type

1. (d)	2. (c)	3. (b)	4. (a)	5. (c)	6. (c)	7. (b)	8. (a)	9. (b)	10. (c)
11. (c)	12. (c)	13. (c)	14. (a)	15. (b)	16. (c)	17. (b)	18. (c)	19. (a)	20. (b)
21. (d)	22. (a)	23. (b)	24. (c)	25. (a)					

Exercise-4 : Matrix Match Type

1. (a) → R;	(b) → R, S;	(c) → P;	(d) → P, Q
2. (a) → R, S;	(b) → P, Q, R;	(c) → P, Q;	(d) → S
3. (a) → Q, R;	(b) → P, S;	(c) → Q;	(d) → P, S
4. (a) → P, S;	(b) → P, S;	(c) → P, R;	(d) → Q, S
5. (a) → P, Q;	(b) → P, R, S;	(c) → S;	(d) → P, Q

Exercise-5 : Integer Answer Type Problems

1. (5)	2. (5)	3. (6)	4. (4)	5. (7)	6. (6)	7. (4)	8. (3)	9. (4)	10. (3)

10 Biomolecules

EXERCISE-1 ONLY ONE CORRECT ANSWER

LEVEL-1

1. Which of the following is not a monosaccharide ?
   (a) Glucose (b) Fructose (c) Cellulose (d) Ribose
2. Glucose is :
   (a) aldopentose (b) aldohexose (c) ketopentose (d) ketohexose
3. The monomer units of starch are :
   (a) α - glucose (b) β - glucose (c) pyranose (d) galactose
4. Which of the following is the sweetest ?
   (a) Glucose (b) Fructose (c) Maltose (d) Sucrose
5. Maltose is made up of :
   (a) α - D - glucose (b) D - fructose
   (c) α - D - glucose and β - D - glucose (d) glucose and fructose
6. Which one of the following is used to identify glucose ?
   (a) Neutral $FeCl_3$ (b) $CHCl_3$ + KOH (alc.)
   (c) C_2H_5ONa (d) Ammoniacal $AgNO_3$
7. The carbohydrate which cannot be hydrolysed by the human digestive system is :
   (a) starch (b) glycogen (c) cellulose (d) all of these
8. Which of the following has a branched chain structure ?
   (a) Amylopectin (b) Amylose (c) Cellulose (d) Nylon
9. Glucose reacts with acetic anhydride to form :
   (a) monoacetate (b) tetra-acetate (c) penta-acetate (d) hexa-acetate
10. DNA molecule is formed of :
    (a) pentose sugar, pyrimidines and purines
    (b) pentose sugar, phosphoric acid, pyrimidines and purines
    (c) pentose sugar, phosphoric acid and purines
    (d) chloridepentose sugar, phosphoric acid and pyrimidines
11. Glucose is hydrolysed by zymase into :
    (a) dicarboxylic acid (b) alcohol
    (c) amino acids (d) aromatic acids
12. Which of the following monosaccharides is a pentose ?
    (a) Glucose (b) Fructose (c) Ribose (d) Galactose
13. Ring structure of glucose is due to formation of hemiacetal and ring formation between :
    (a) C_1 and C_5 (b) C_1 and C_4 (c) C_1 and C_3 (d) C_2 and C_4

14. Glucose is :
(a) monosaccharide
(b) disaccharide
(c) trisaccharide
(d) polysaccharide

15. Hydrolysis of sucrose is called :
(a) esterification
(b) saponification
(c) inversion
(d) hydration

16. Starch is changed into disaccharide in presence of :
(a) amylase
(b) maltase
(c) lactase
(d) zymase

17. The disaccharide present in milk is :
(a) sucrose
(b) maltose
(c) lactose
(d) cellobiose

18. A carbohydrate which cannot be hydrolysed to simpler compounds is called :
(a) monosaccharide
(b) polysaccharide
(c) disaccharide
(d) trisaccharide

19. Which of the following is not a reducing sugar ?
(a) Sucrose
(b) Galactose
(c) Glucose
(d) Lactose

20. How many carbon atoms can be found in a monosaccharide ?
(a) 5-6
(b) 3-5
(c) 3-7
(d) 1-5

21. A nucleoside is :
(a) base + sugar
(b) base + phosphate
(c) sugar + phosphate
(d) base + sugar + phosphate

22. Hair, finger, nails , hoofs, etc. are all made of :
(a) fat
(b) vitamins
(c) proteins
(d) iron

23. Mark the globular protein in the following.
(a) Collagen
(b) Myoglobin or Haemoglobin
(c) Myosin
(d) Fibroin

24. The end product of protein digestion is :
(a) peptides
(b) peptones
(c) protones
(d) α - amino acids

25. Which one is the complimentary base of adenine in one strand to that in the other strand of DNA ?
(a) Cytosine
(b) Guanine
(c) Uracil
(d) Thymine

26. The base present in RNA but not found in DNA is :
(a) Thymine
(b) Uracil
(c) Adenine
(d) Guanine

27. Calorific value is in the order :
(a) Fats > Protein > Carbohydrates
(b) Carbohydrates > Fats > Protein
(c) Fats > Carbohydrates > Protein
(d) Protein > Fats > Carbohydrates

28. Deficiency of vitamin A results in :
(a) scurvy (b) night blindness
(c) beri-beri (d) rickets

29. Riboflavin deficiency causes :
(a) scurvy (b) pellagra
(c) beri-beri (d) cheilosis

30. A good source of vitamins A and D is :
(a) whole cereal (b) cod liver oil
(c) yeast (d) water melon

31. Ascorbic acid is called is :
(a) vit. C (b) vit. A
(c) vit. D (d) vit. B

32. Continuous bleeding from an injured part of body is due to deficiency of :
(a) vitamin A (b) vitamin E
(c) vitamin B (d) vitamin K

33. Cobalt as a rare element is essential in the synthesis of this vitamin.
(a) Vitamin C (b) Vitamin D
(c) Vitamin B_1 (d) Vitamin B_{12}

34. Scurvy is a disease caused by :
(a) a virus (b) deficiency of vitamin E
(c) deficiency of ascorbic acid (d) deficiency of vitamin D

35. Which pairing is found in DNA ?
(a) Adenine with thymine (b) Thymine with guanine
(c) Guanine with adenine (d) Uracil with adenine

36. AGCT are nitrogenous bases of DNA. The pairing is :
(a) A—G, C—T (b) A—T,G—C
(c) A—C,G—T (d) A—T,G—T

37. The successive nucleotides of DNA are covalently linked through :
(a) peptide bonds (b) hydrogen bonds
(c) glycosidic bonds (d) phosphodiester bonds

38. Lactose is composed of :
(a) glucose + glucose (b) glucose + fructose
(c) glucose + galactose (d) fructose + galactose

39. Glucose $\xrightarrow{\text{HCN}} \xrightarrow{\text{Hydrolysis}} \xrightarrow{\text{HI heat}} A$, A is :
(a) hypotonic acid (b) 2-iodohexane
(c) heptane (d) heptanol

40. Glucose $\xrightarrow{Br_2+H_2O}$ Product ; Product is :
(a) glucaric acid (b) gluconic acid
(c) hexanoic acid (d) bromo hexane

41. Number of possible isomers of glucose is :
(a) 16 (b) 14
(c) 10 (d) 8

42. Carbohydrates which differ in configuration at the glycosidic carbon (*i.e.*, C_1 in aldose and C_2 in ketoses) are called :
(a) anomers (b) epimers (c) diastereomers (d) enantiomers

43. A pair of diastereomers that differ only in the configuration about a single carbon atom are called :
(a) anomers (b) epimers (c) conformers (d) enantiomers

44. Osazone formation involves only 2-carbon atoms of glucose because of :
(a) oxidation (b) reduction (c) chelation (d) hydrolysis

LEVEL-2

1. The minimum number of carbon atoms that should be present in a carbohydrate is :
(a) 2 (b) 3 (c) 4 (d) 6

2. Carbohydrates are commonly defined as :
(a) Polycarbonyl compounds (b) Polycarboxylic acid
(c) Polyhydroxy carboxylic acid (d) Polyhydroxy aldehyde and ketone

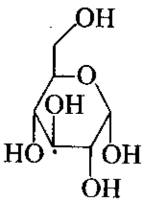
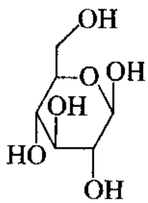
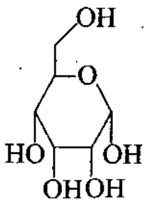
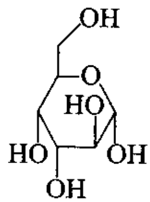
3. Carbohydrate that on attempt hydrolysis are not cleaved to smaller carbohydrates are called :
(a) Monosaccharide (b) Oligosaccharide
(c) Polysaccharide (d) Disaccharide

4. The number of chiral centers in the open chain structure of glucose is :
(a) 3 (b) 4 (c) 5 (d) 6

5. Cane sugar on hydrolysis gives :
(a) Glucose and Galactose (b) Glucose only
(c) Glucose and Fructose (d) Fructose only

6. The carbohydrate present in milk :
(a) Sucrose (b) Maltose (c) Lactose (d) Celobios

7. Which of the following structures represents α-*D*-glucopyranose?

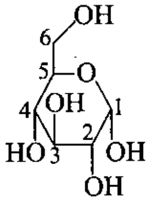
(a) 
(b) 
(c) 
(d) 

8. α-*D*-Glucopyranose and β-*D*-Glucopyranose are :
(a) Anomers (b) Epimer
(c) Diastereomers (d) Meso compounds

9. The disaccharide that is constituted of two glucose unit is :
(a) Lactose (b) Maltose (c) Sucrose (d) Ribose

10. Invert sugar is an equimolar mixture of :
(a) *D*-Glucose and *D*-Fructose (b) *D*-Glucose and *L*-Fructose
(c) *D*-Glucose and *L*-Glucose (d) *D*-Fructose and *L*-Fructose

11. In α-*D*-Glucose, the anomeric carbon is at :



(a) 1 (b) 2 (c) 4 (d) 5

12. In the ring structure of fructose, the anomeric carbon is :
(a) C—1 (b) C—5 (c) C—2 (d) C—6

13. Fructose reduces Fehling's solution due to the presence of :
(a) hydroxy group (b) aldehyde group
(c) ketone group (d) α-hydroxy ketone group

14. Which of the following reagents may be used to identify glucose?
(a) Neutral $FeCl_3$ solution (b) Ammoniacal $AgNO_3$ solution
(c) $CHCl_3$ and KOH (alc.) (d) $NaHSO_3$

15. Upon hydrolysis lactose breaks down into :
(a) glucose and mannose (b) glucose and fructose
(c) glucose and galactose (d) glucose and arabinose

16. Glucose and galactose differ in configuration at :
(a) C—1 (b) C—2 (c) C—3 (d) C—4

17. Which of the following is C—2 epimer of *D*-Glucose?
(a) *D*-Galactose (b) *L*-Glucose
(c) *D*-Mannose (d) *D*-Fructose

18. Starch is a polymer of :
(a) fructose (b) glucose (c) lactose (d) ribose

19. Glucose when treated with CH_3OH in presence of dry HCl gives α-and β-methylglucosides because it contain :
(a) an aldehydic group (b) $—CH_2—OH$ group
(c) Five —OH group (d) None of these

20. Which of the following is a non reducing sugar?
(a) Glyceraldehyde (b) Glucose
(c) Fructose (d) Sucrose

21. Glycosidic linkage is :
(a) an amide linkage (b) an ester linkage
(c) an ether linkage (d) an amine linkage

22. Pyranose ring consist of a skelton of :
(a) 5 carbon atoms and one oxygen atom
(b) 6 carbon atoms
(c) 6 carbon atoms and one oxygen atom
(d) 4 carbon atoms and one oxygen atom

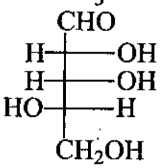
23. Glucose and Fructose can be differentiated by :
(a) Tollen's reagent (b) Cold $KMnO_4$
(c) Br_2/H_2O (d) PCC

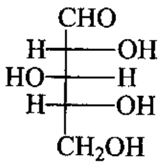
24. Periodic acid splits glucose and fructose into formic acid and formaldehyde. Ratio of formic acid and formaldehyde from glucose and fructose is :
(a) 5/1 and 4/2 (b) 5/1 and 3/2 (c) 4/2 and 4/2 (d) 3/2 and 4/2

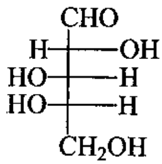
25. An aldose is converted into its next higher homologue by :
(a) Ruff's method (b) Amadori rearrangement
(c) Killiani synthesis (d) Wohl's method

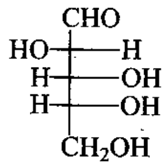
26. The change in optical rotation with time of freshly prepared solution of sugar is known as :
(a) Specific rotation (b) Mutarotation
(c) Inversion (d) Rotatory motion

27. Which of the following gives an optically inactive aldaric acid on oxidation with dilute HNO_3 acid?

(a) 

(b) 

(c) 

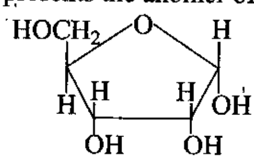
(d) 

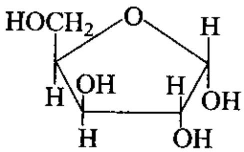
28. Glucose does not react with :
(a) $C_6H_5NHNH_2$ (b) $H_2N—OH$ (c) HCN (d) $NaHSO_3$

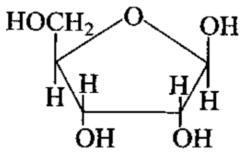
29. Cellulose is a linear polymer of :
(a) α-*D*-Glucose (b) β-*D*-Glucose
(c) α-*D*-Fructose (d) β-*L*-Glucose

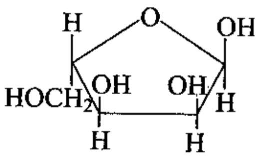
30. Rapid interconversion of α-*D*-Glucose and β-*D*-Glucose in solution is known as :
(a) racemisation (b) asymmetric induction
(c) fluxional isomerisation (d) mutarotation

31. Which of the following represents the anomer of compound shown?

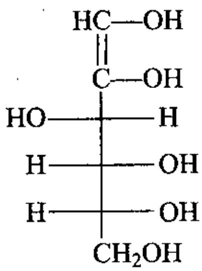


(a) 

(b) 

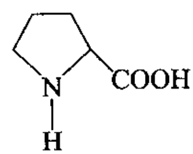
(c) 

(d) All of these

32. , the given is enol form of :

(a) *D*-Glucose (b) *D*-Mannose
(c) *D*-Fructose (d) All of these

33. The numbers of chiral centers present in glucopyranose and fructofuranose are :
(a) 4 and 3 (b) 5 and 4 (c) 4 in each (d) 5 in each

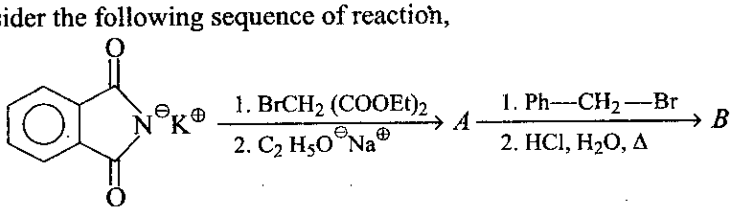
34. Which of the following is an amino acid?
(a) $H_2N—COOH$
(b) $CH_3—CH(CONH_2)—COOH$
(c) $NH_2—C(=O)—COOH$
(d) 

35. Amino acids undergo internal acid base reaction to form :
(a) an amide (b) a lactum (c) zwitter ion (d) a peptide

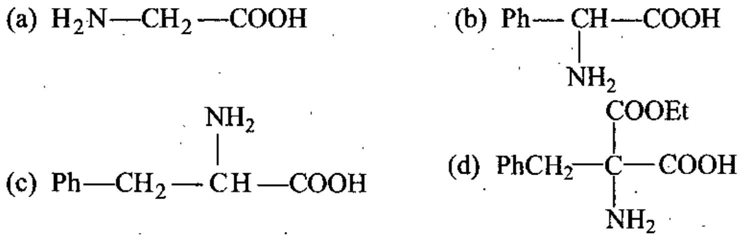
36. An amino acid usually shows its lowest solubility in water :
(a) in acidic solution (b) in basic solution
(c) at pH 7 (d) at isoelectric point

37. Which one among following is a peptide linkage?
(a) $—C(=O)—NH—$
(b) $—N{=}C(R)—O—$
(c) $—C(R){=}N—H$
(d) $—\overset{|}{\underset{H}{C}}—O—\underset{H}{N}—$

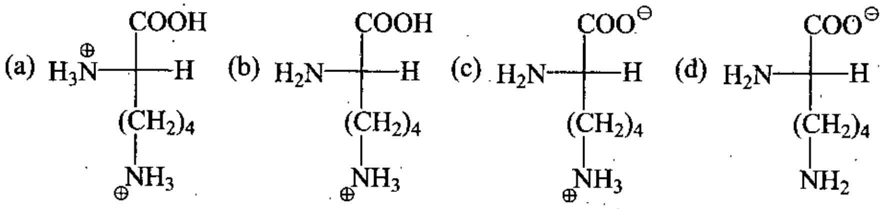
38. Consider the following sequence of reaction,



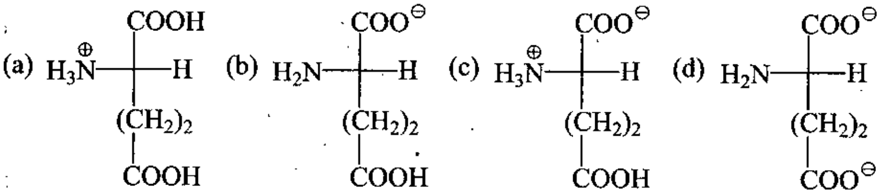
The major final product (B) is :



39. Which of the following is the major solute species in a solution of lysine at pH = 10.5.

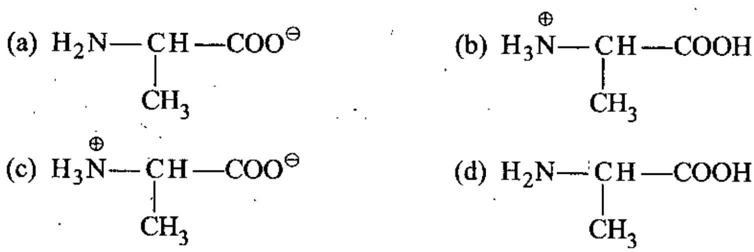


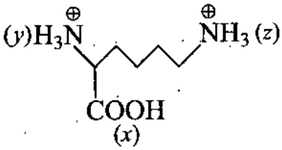
40. Which of the following is the major solute species in a solution of glutamic acid at pH = 1.3.



41. Which of the following statements most correctly defines the isoelectric point?
   (a) The pH at which all molecular species are ionised and that carry the same charge.
   (b) The pH at which all molecular species are neutral and uncharge.
   (c) The pH at which half of the molecular species are ionised and the other half unionised.
   (d) The pH at which negatively and positively charged molecular species are present in equal concentration.

42. Alanine at its isoelectric point, exist in solution as :



43. 

The order of decreasing acidity of these acidic sites is :

(a) $x > z > y$ (b) $z > x > y$
(c) $x > y > z$ (d) $y > x > z$

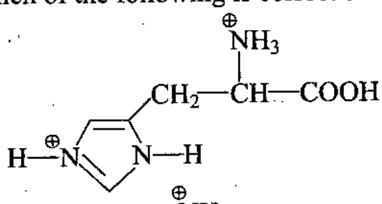
44. Biuret test is used for the detection of :

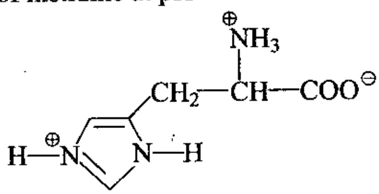
(a) sugar (b) proteins (c) fats d) starch

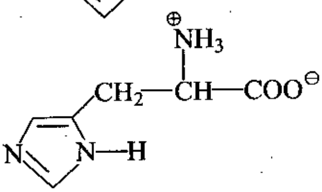
45. α-Amino acids behave as crystalline ionic solid and have high melting point due to the presence of :

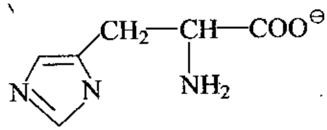
(a) —NH_2 group (b) —COOH group
(c) both —NH_2 and —COOH (d) None of these

46. Which of the following is correct structure of histidine at pH = 0?

(a) 

(b) 

(c) 

(d) 

47.
CHO
|
CH—OH
|
CH—OH
|
CH_2—OH

$\xrightarrow[\text{HCl}]{\text{KCN}} \xrightarrow[\text{Pd—BaSO}_4]{H_2} \xrightarrow{H_3\overset{\oplus}{O}}$ Product.

Find out final product :

(a)
CH_2OH
|
$(CHOH)_3$
|
CH_2OH

(b)
CHO
|
$(CH—OH)_3$
|
CH_2—OH

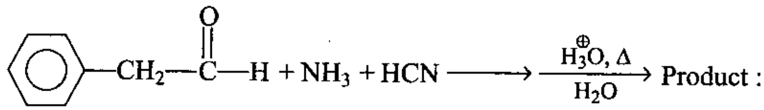
(c)
COOH
|
$(CH—OH)_3$
|
CH_2—OH

(d)
COOH
|
$(CHOH)_3$
|
COOH

48. $\underset{CH_2OH}{\overset{CHO}{(CHOH)_3}} \xrightarrow[Ca(OH)_2]{Br_2,\ H_2O} \xrightarrow[Fe^{3+}]{H_2O_2}$ Product :

(a) $\underset{CH_2OH}{\overset{COOH}{(CHOH)_3}}$ (b) $\underset{CH_2OH}{\overset{CHO}{(CHOH)_4}}$

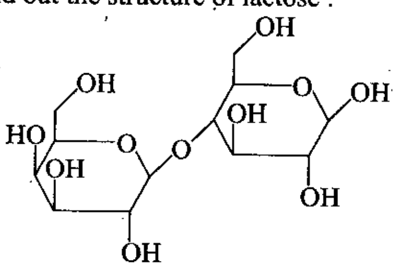
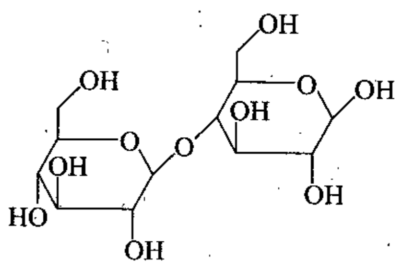
(c) $\underset{CH_2OH}{\overset{CHO}{(CHOH)_2}}$ (d) $\underset{COOH}{\overset{COOH}{(CHOH)_3}}$

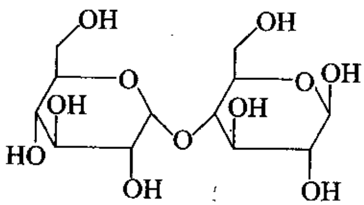
49. 

(a) $Ph-CH_2-\underset{NH_2}{\overset{OH}{C}}-H$ (b) $Ph-CH_2-\underset{CN}{\overset{OH}{C}}-H$

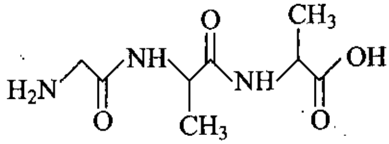
(c) $Ph-CH_2-\underset{COO^{\ominus}}{\overset{H}{C}}-\overset{\oplus}{N}H_3$ (d) All of these

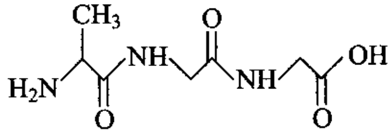
50. Find out the structure of lactose :

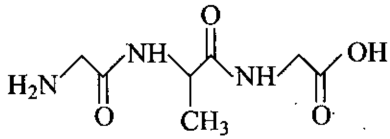
(a)  (b) 

(c)  (d) None of these

51. A tripeptide is written as Glycine-Alanine-Glycine. The correct structure of tripeptide.

(a) 

(b) 

(c) 

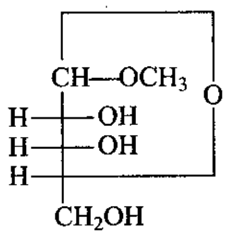
(d) None of these

52. What would be the net charge on the given amino acid at pH = 14 ?

$$H_2N{-}\underset{}{\overset{COOH}{\overset{|}{C}H}}{-}(CH_2)_4{-}\overset{O}{\overset{||}{C}}{-}OH$$

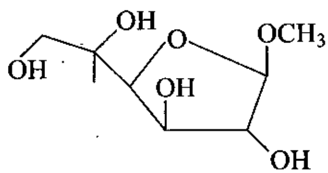
(a) −1 (b) −2 (c) +1 (d) +2

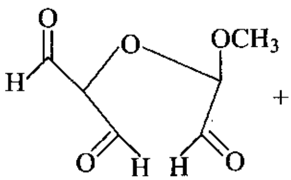
53. How many moles of HIO_4 is required to break down the given molecule here ?

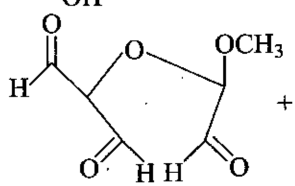


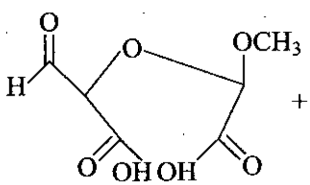
(a) 0 (b) 1 (c) 2 (d) 3

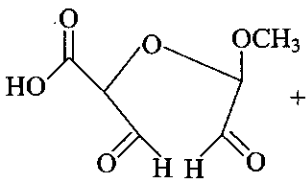
54. The products of HIO_4 oxidation of the following compound is :



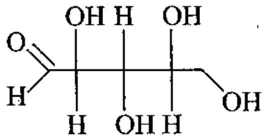
(a)  + HCOOH

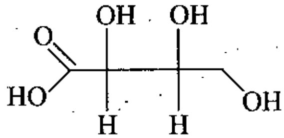
(b)  + HCHO

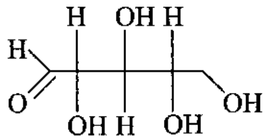
(c)  + HCHO

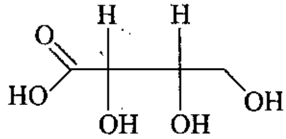
(d)  + HCOOH

55. Which of the following compounds is *D*-aldopentose :

(a) 

(b) 

(c) 

(d) 

EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. The final product of which of the following reactions furnishes evidence that glucose has unbranched carbon chain :

(a) Glucose $\xrightarrow[\text{2. Red P + HI}]{\text{1. Br, } H_2O}$

(b) Glucose $\xrightarrow[\text{2. Red P + HI}]{\text{1. } NaBH_4}$

(c) Glucose $\xrightarrow[\substack{\text{2. } H_3^{\oplus}O \\ \text{3. Red P + HI}}]{\text{1. HCN}}$

(d) Glucose $\xrightarrow{CH_3OH,\ H^{\oplus}}$

2. Which of the following reagents would convert an aldose into corresponding aldonic acid?

(a) Tollen's reagent
(b) Fehling's solution
(c) Bromine water
(d) Red P + HI

3. Which of the following statements are correct?

(a) Monosaccharides are optically active polyhydroxy carbonyl compounds.
(b) Fructose does not react with Fehling's solution because it is keto.
(c) α-*D*-Glucose and β-*D*-Glucose are anomers.
(d) *D*-Glucose and *D*-Mannose are epimers.

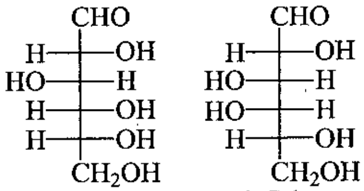
4. Which of the following statements are correct?

(a) Hydrolysis of sucrose with dilute acid yields an equimolar mixture of *D*-Glucose and *D*-Fructose.
(b) Acidic hydrolysis of sucrose is accompained by a change in optical reaction.
(c) In sucrose, the glycosidic linkage is between C—1 glucose and C—2 of fructose.
(d) Aqueous solution of sucrose exhibits mutarotation.

5. Find the correct statements regarding the methyl glucosides obtained by the reaction of *D*-Glucose with methanol in presence of dry HCl gas.

(a) These are methyl ether of hemiacetal of glucose formed by intramolecular reaction.
(b) These are enantiomers.
(c) These are anomers.
(d) In one of these all the substituents are equatorial.

6. Following are the structure of *D*-Glucose and *D*-Galactose.



D-Glucose *D*-Galactose

Which of the following statements are correct about these compounds?

(a) They are diastereomers
(b) Both are component of lactose
(c) They are C—4 epimer
(d) Both are optically active

7. When fructose treated with Tollen's reagent, silver mirror is formed due to reduction of $Ag^{\oplus}$ by :

(a) fructose itself
(b) glucose formed by isomerisation
(c) mannose formed by isomerisation
(d) galactose formed by isomerisation

8. Which of the following do not undergo hydrolysis?

(a) Glucose (b) Fructose (c) Cane sugar (d) Maltose

9. Which of the following carbohydrate will give the same osazone?

(a) Glucose (b) Fructose (c) Cane sugar (d) Lactose

10. Which of the following are disaccharides?

(a) Glucose (b) Cane sugar (c) Maltose (d) Starch

11. On hydrolysis which of the following carbohydrate give only glucose?

(a) Sucrose (b) Lactose (c) Maltose (d) Starch

12. The presence of —CHO group in glucose is confirmed by its :

(a) reaction with PCl_5
(b) reaction by Na—Hg to give S-orbitol
(c) reaction with Fehling solution
(d) reaction with Tollen's reagent

13. Which of the following statements are correct for glucose?

(a) It gives positive test with Schiff's reagent
(b) It reacts with $NaHSO_3$ and NH_3
(c) Pentaacetate derivative of glucose does not react with H_2N—OH
(d) It gives positive test with Fehling solution.

14. When *D*-Glucose is treated with base it is converted into :

(a) *D*-Fructose
(b) *D*-Mannose
(c) *D*-Galactose
(d) *D*-Arabinose

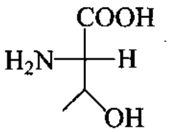
15. The phenomenon of mutarotation is shown by :

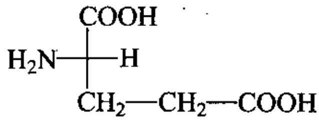
(a) glucose (b) fructose (c) cellulose (d) starch

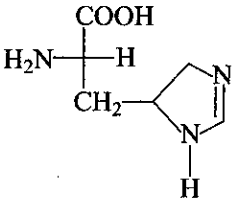
16. Which of the following statements are correct with reference to amino acid?
(a) A carboxylic acid that contains an amino group.
(b) Amino acids are the building blocks of peptides and proteins.
(c) An amino acid may exist as a zwitter ion under suitable conditions.
(d) Amino acids are negatively charged in basic medium.

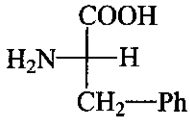
17. Which of the following statements are correct with reference to isoelectric point?
(a) It is the point at which amino acids bear no net charge.
(b) It corresponds to the pH at which concentration of zwitter ion is maximum.
(c) At isoelectric point amino acid exists as a base.
(d) None of the above.

18. Choose the neutral amino acid :

(a) 

(b) 

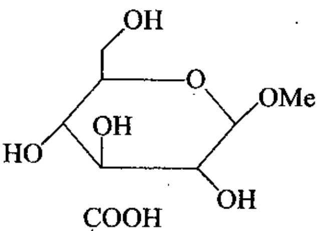
(c) 

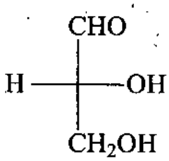
(d) 

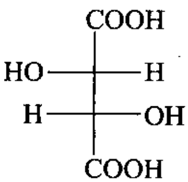
19. Consider the following statements about amino acids :
(a) the amino acids that constitute proteins are all *L*-amino acids.
(b) among the 20 amino acids that constitute proteins, glycine is the only one that does not possess chiral center.
(c) an important and sensitive test for the detection of *L*-amino acid is the ninhydrin colour test.
(d) HNO_2 liberates nitrous oxide from amino acid.

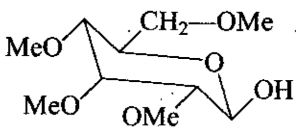
20. Globular protein is present in :
(a) blood (b) milk (c) eggs (d) cellulose

21. Which of the following carbohydrate are *D*-isomers?

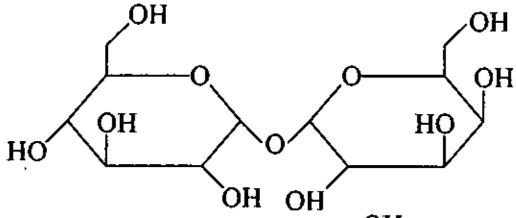
(a) 

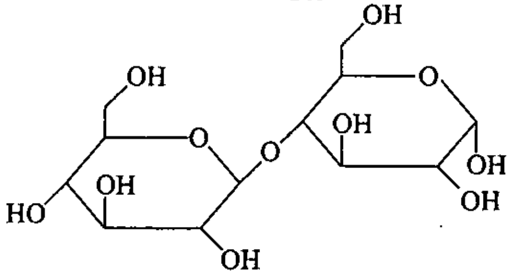
(b) 

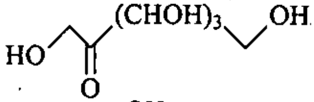
(c) 

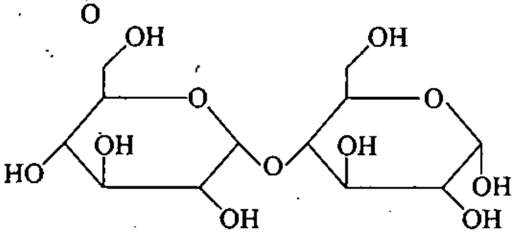
(d) 

22. Which of the following are reducing sugar?

(a) 

(b) 

(c) 

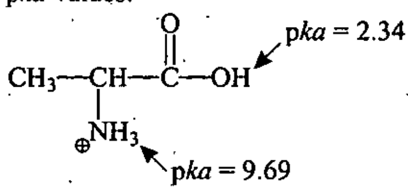
(d) 

23. Which are true ?
   (a) Glucose is a disaccharide
   (b) Starch is a polysaccharide
   (c) Glucose and fructose are not anomer
   (d) Invert sugar consist of glucose and fructose

EXERCISE-3 LINKED COMPREHENSION TYPE

Passage-1

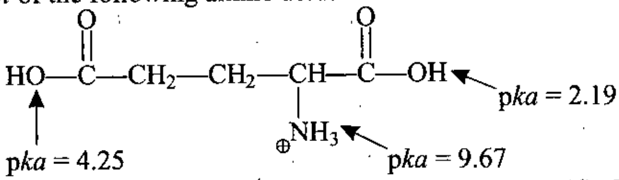
The isoelectric point (pI) of an amino acid is the pH of which it has no net charge. The pI of an amino acid that does not have an ionizable side chain such as alanine, is midway between its two p*ka* values.



$$pI = \frac{2.34 + 9.69}{2} = 6.02$$

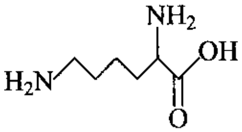
If an amino acid has ionizable side chain, its *pI* is the average of the p*ka* values of the similarly ionizing groups.

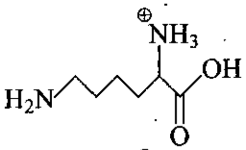
1. Find the *pI* of the following amino acids :

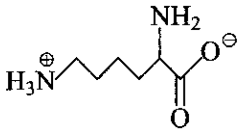


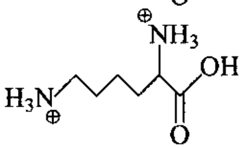
(a) 3.22 (b) 6.44 (c) 7.96 (d) 5.93

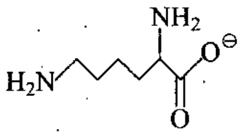
2. Find the structure of the following amino acids at pH = 1 :



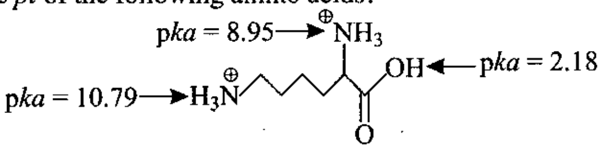
(a) 

(b) 

(c) 

(d) 

3. What is the *pI* of the following amino acids?



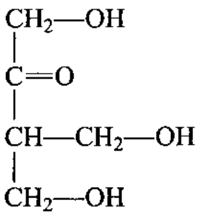
(a) 3.22 (b) 9.87 (c) 5.6 (d) 6.49

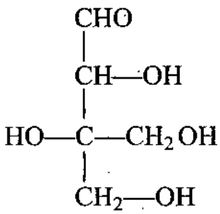
Passage-2

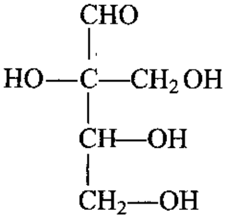
Study the Observation

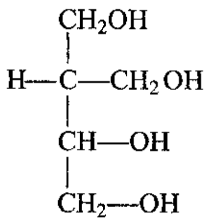
Compounds	Red P + HI	Ac_2O/pyridine	Br_2+H_2O	HIO_4	Ph—NH—NH_2
$(X)\ C_5H_{10}O_5$	Isopentane	Tetraacetate	$C_5H_{10}O_6$	4 mole	No Osazone
$(Y)\ C_5H_{10}O_4$	Isopentane	Triacetate	$C_5H_{10}O_5$	1 mole	Osazone formed
$(Z)\ C_5H_{10}O_4$	*n*-pentane	Triacetate	$C_5H_{10}O_5$	2 mole	Osazone formed

4. Compound '*X*' is :

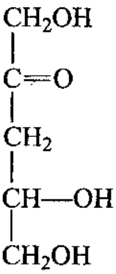
(a) 

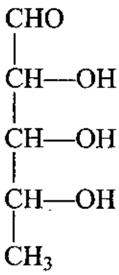
(b) 

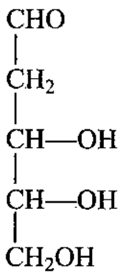
(c) 

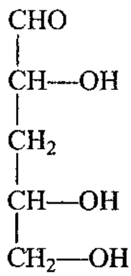
(d) 

5. Compound 'Z' is :

(a) 

(b) 

(c) 

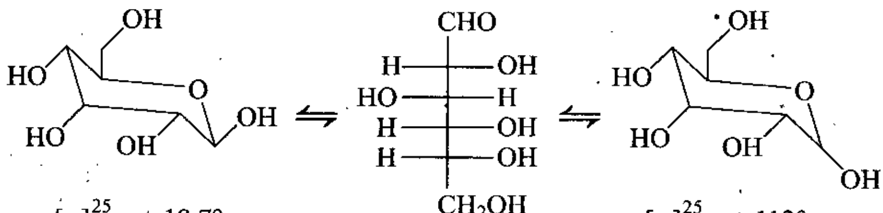
(d) 

6. Which of the following are the reducing sugars?

(a) X and Y
(b) X and Z
(c) Y and Z
(d) All of these

Passage-3

D (+) Glucose has melting point 146°C and specific rotation $[\alpha]_D^{25}$ is + 112°C. Another D (+) Glucose has melting point 150°C and specific rotation $[\alpha]_D^{25}$ is +18.7°C. The two form have significantly different optical rotation but when an aqueous solution of either form is allowed to stand, it rotation changes. The specific rotation of one form decreases and rotation of other increases until both solution show the same value +52.7°. The change in rotation towards an equilibrium value is called mutarotation.



$[\alpha]_D^{25} = +18.7°$ $[\alpha]_D^{25} = +112°$

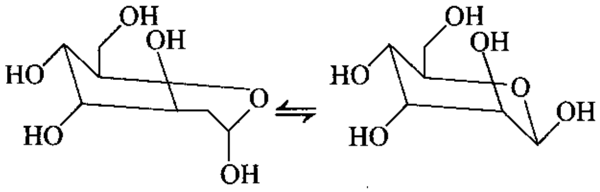
7. Mutarotation is characteristic feature of :

(a) Epimer
(b) Enantiomer
(c) Anomer
(d) Ring chain isomer

8. What percentage of β-D-(+) glucopyranose found at equilibrium in the aqueous solution?

(a) 50%
(b) ≈100%
(c) 38%
(d) 64%

9. For mannose the mutarotation can be shown in brief as follow :



(a) α-form (b) β-form (c) open chain (d) none of these

Passage-4

Protein are nitrogeneous organic compound having very high molecular mass. They are polyamide formed from α-amino acid. The bond formed between two amino acid is called peptide bond ($-\overset{\overset{\large O}{\|}}{C}-NH-$). The product obtained by this peptide bond formation are called peptide and they may be divided as di, tri, tetra, penta peptide.

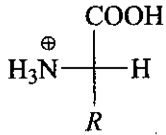
10. Consider following statements concerning protein.

1. All amino acids which are constituents of proteins or α-amino acid.
2. α-amino acids are all optically active and have *L*-configuration.
3. An especially favourable conformation for the peptide linkage in protein is the α-helix arrangement.
4. α-amino acids are connected by ester linkage.

Which of the following statement are correct?

(a) 1 and 3 (b) 1 and 2 (c) 2 and 3 (d) 2, 3 and 4

11. The given structure of amino acid will exist at which pH?



(a) 0 (b) 6 (c) 7 (d) 12

12. Which statement are correct about peptide bond?

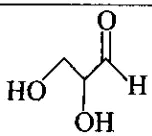
1. $-\overset{\overset{\large O}{\|}}{C}-NH-$ group is planar.
2. C—N bond length in protein is longer than usual bond length of C—N bond.
3. C—N bond length in protein is smaller than usual bond length of C—N bond.

(a) 2 and 3 (b) 1 and 2 (c) 2 only (d) 1 and 3

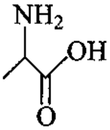
EXERCISE-4 MATRIX MATCH TYPE

1. Column (I) **Column (II)**

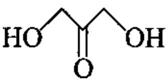
(a) $CH_3-\underset{}{\overset{\overset{\large OH}{|}}{C}H}-CHO$ *P.* Carbohydrate

(b) 

Q. Amino acid

(c) 

R. Positive Tollen's test

(d) 

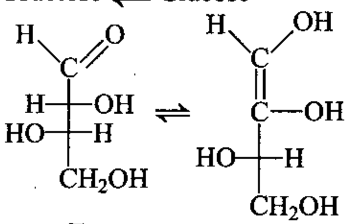
S. Ninhydrin test

2. Column (I) — **Column (II)**

(a) α-*D*-Glucopyranose ⇌ β-*D*-Glucopyranose — *P*. Lobry De Bruyn Alberda van Ekenstein transformation

(b) Glucose ⇌ Mannose — *Q*. Mutarotation

(c) Fructose ⇌ Glucose — *R*. Tautomerisation

(d)  — *S*. Epimerisation

3. Column (I) — **Column (II)**

(a) Sucrose — *P*. 1, 2-glycosidic linkage

(b) Cellulose — *Q*. 1, 4-glycosidic linkage

(c) Maltose — *R*. Polysaccharide

(d) Starch — *S*. Disaccharide

4. Column (I) — **Column (II)**

(a) Glucose — *P*. Reduces Tollen's reagent

(b) Fructose — *Q*. Exhibit mutarotation in mild alkaline medium

(c) Mannose — *R*. Produces tetraacetate derivative on treatment with anhydride and pyridine

(d) Glucopyranoside — *S*. Gets oxidised by Br_2, H_2O

5. Column (I) — **Column (II)**

(a) Maltose — *P*. Invert sugar

(b) Sucrose — *Q*. Reducing sugar

(c) Lactose — *R*. Glycosidic linkage

(d) Fructose — *S*. Disaccharide

6. Column (I) — **Column (II)**

(a) Cellulose — *P*. Polymer

(b) Protein — *Q*. Nitrogen containing

(c) Lipid — *R*. Stored food in human

(d) Nucleic acid — *S*. Ester

ANSWERS

Exercise-1 : Only One Correct Answer

Level-1

1. (c)	2. (b)	3. (a)	4. (b)	5. (a)	6. (d)	7. (c)	8. (a)	9. (c)	10. (b)
11. (b)	12. (c)	13. (a)	14. (a)	15. (c)	16. (a)	17. (c)	18. (a)	19. (a)	20. (c)
21. (a)	22. (c)	23. (b)	24. (d)	25. (d)	26. (b)	27. (c)	28. (b)	29. (d)	30. (b)
31. (a)	32. (d)	33. (d)	34. (c)	35. (a)	36. (d)	37. (d)	38. (c)	39. (a)	40. (b)
41. (a)	42. (a)	43. (b)	44. (c)						

Level-2

1. (b)	2. (d)	3. (a)	4. (b)	5. (c)	6. (c)	7. (a)	8. (a)	9. (b)	10. (a)
11. (a)	12. (c)	13. (d)	14. (b)	15. (c)	16. (d)	17. (c)	18. (b)	19. (a)	20. (d)
21. (c)	22. (a)	23. (c)	24. (b)	25. (c)	26. (c)	27. (b)	28. (d)	29. (b)	30. (d)
31. (b)	32. (d)	33. (b)	34. (d)	35. (c)	36. (d)	37. (a)	38. (c)	39. (d)	40. (a)
41. (d)	42. (c)	43. (c)	44. (b)	45. (c)	46. (a)	47. (b)	48. (c)	49. (c)	50. (a)
51. (c)	52. (b)	53. (b)	54. (b)	55. (a)					

Exercise-2 : More Than One Correct Answers

1. (a, b, c)	2. (a, b, c)	3. (a, c, d)	4. (a, b, c)	5. (a, c, d)	6. (a, b, c, d)
7. (b, c)	8. (a, b)	9. (a, b)	10. (b, c)	11. (c, d)	12. (b, c, d)
13. (c, d)	14. (a, b)	15. (a, b)	16. (a, b, c, d)	17. (a, b)	18. (a, d)
19. (a, b, c)	20. (a, b, c)	21. (a, b, c, d)	22. (b, c, d)	23. (b, c, d)	

Exercise-3 : Linked Comprehension Type

1. (a)	2. (c)	3. (b)	4. (c)	5. (d)	6. (d)	7. (c)	8. (d)	9. (b)	10. (a)
11. (a)	12. (d)								

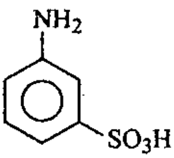
Exercise-4 : Matrix Match Type

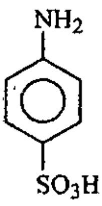
1. (a) $\rightarrow R$;	(b) $\rightarrow P, R$;	(c) $\rightarrow Q, S$;	(d) $\rightarrow P, R$
2. (a) $\rightarrow Q, R$;	(b) $\rightarrow P, S$;	(c) $\rightarrow P$;	(d) $\rightarrow P, R$
3. (a) $\rightarrow P, S$;	(b) $\rightarrow Q, R$;	(c) $\rightarrow Q, S$;	(d) $\rightarrow Q, R$
4. (a) $\rightarrow P, Q, S$;	(b) $\rightarrow P, Q$;	(c) $\rightarrow P, Q, R$;	(d) $\rightarrow R$
5. (a) $\rightarrow Q, R, S$;	(b) $\rightarrow P, R, S$;	(c) $\rightarrow Q, R, S$;	(d) $\rightarrow Q$
6. (a) $\rightarrow P$;	(b) $\rightarrow P, Q$;	(c) $\rightarrow R, S$;	(d) $\rightarrow P, Q$

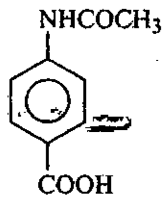
11 Practical Organic Chemistry

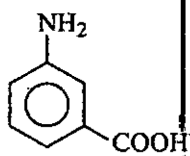
EXERCISE-1 ONLY ONE CORRECT ANSWER

1. Carbon and hydrogen in organic compounds are detected by heating compound with :
   (a) FeO (b) CaO (c) CuO (d) MnO
2. Lassaigne's test is not used for the detection of :
   (a) N (b) S (c) Cl (d) O
3. When an organic compound is present in an aqueous medium and is less soluble in any organic solvent then, it is separated by :
   (a) continuous extraction (b) distillation
   (c) chromatography (d) sublimation
4. Ammonium molybdate is used for detection of which element in organic compound :
   (a) C (b) N (c) P (d) S
5. A white crystalline solid '*X*' give following chemical test :
   (i) it liberates CO_2 with $NaHCO_3$
   (ii) it form a coloured dye on diazotisation and coupling with β-naphthol
   (iii) with Br_2 water it forms white precipitate of 2, 4, 6-tribromo aniline.
   '*X*' can be identified as :

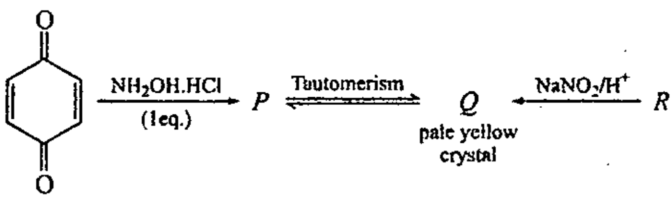
(a) 

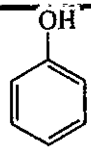
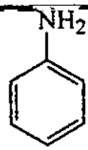
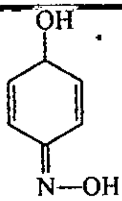
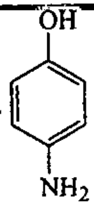
(b) 

(c) 

(d) 

6. Identify the reactant '*R*'



(a)  (b)  (c)  (d) 

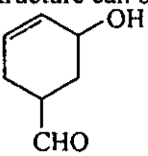
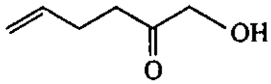
7. Compound 'X' give following reactions

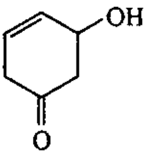
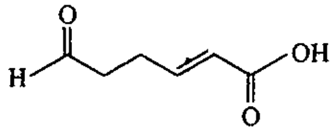
$X\ (C_6H_8O_2) \xrightarrow{\text{Na metal}} H_2\ \text{gas}\uparrow$

$X\ (C_6H_8O_2) \xrightarrow{\text{2,4-DNP}} \text{Yellow orange ppt}$

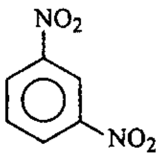
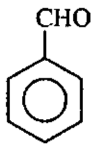
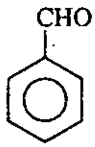
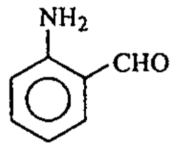
$X\ (C_6H_8O_2) \xrightarrow{O_3} B\ (C_6H_8O_4)$

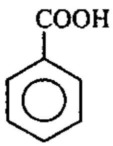
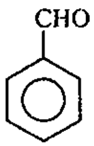
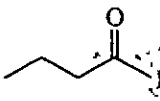
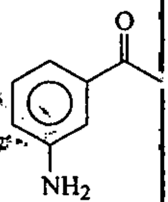
Its structure can be:

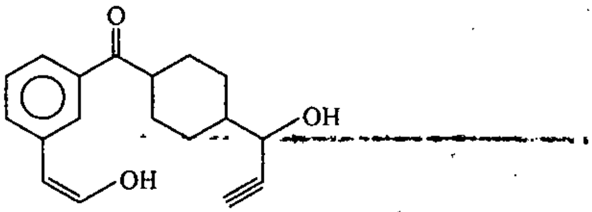
(a)  (b) 

(c)  (d) 

8. A mixture of two organic compound gives red coloured precipitate with cuprous chloride and silver mirror on heating with Zn and NH_4Cl followed by $AgNO_3 + NH_4OH$ solution. The mixture contains :

(a)  and  (b)  and 

(c)  and  (d)  and 

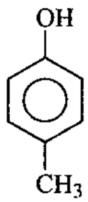
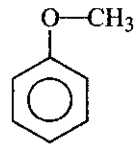
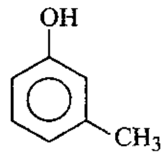
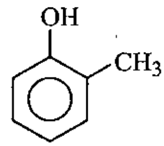
9. 

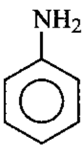
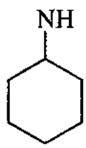
which of the following reagents will not react with above compound?

(a) Na metal (b) $AgNO_3 + NH_4OH$

(c) $Cu_2Cl_2 + NH_4OH$ (d) $NaHCO_3$

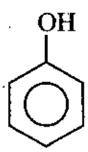
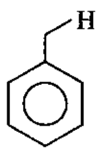
10. Compound '*P*', C_7H_8O is insoluble in water, dilute HCl and $NaHCO_3$. It dissolves in dilute NaOH. When *P* is treated with Br_2—H_2O, it convert rapidly into a compound of formula $C_7H_5OBr_3$. Identify structure of :

(a)  (b)  (c)  (d) 

11.  and  can be differentiated by :

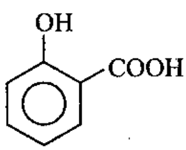
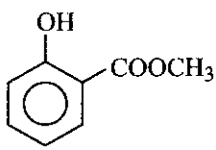
(a) carbylamine reaction (b) H_2SO_4

(c) diazotisation followed by β-naphthol (d) mustard oil reaction

12.  and  can be differentiated by :

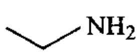
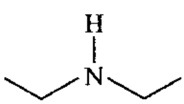
(a) $FeCl_3$ (b) NaOH

(c) $NaNO_2 + HCl$ (d) Fehling's solution

13.  and  can be differentiated by :

(a) NaOH (b) Na metal

(c) $NaHCO_3$ (d) $FeCl_3$

14.  and  can be differentiated by :

(a) carbylamine reaction (b) iodoform test

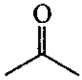
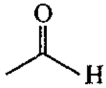
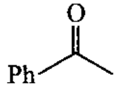
(c) cold $KMnO_4$ (d) Br_2—H_2O

15. $CH_3-\overset{\overset{O}{\|}}{C}-H$ and $Ph-\overset{\overset{O}{\|}}{C}-H$ can be differentiated by :

(a) Tollen's reagent (b) Fehling's solution

(c) Lucas reagent (d) Victor meyer's test

16. Compound 'X' give positive test with 2,4-DNP and with I_2/NaOH compound (X) may be :

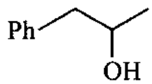
(a)  (b)  (c)  (d) all of these

17. An organic compound containing one oxygen gives red colour with cerric ammonium nitrate solution, decolourise alkaline $KMnO_4$, respond iodoform test and show geometrical isomerism. It should be :

(a) $Ph—CH=CH—CH_2OH$

(b) $Ph—CH=CH—\underset{|}{\overset{OH}{C}}H—CH_3$

(c) $Ph—CH=CH—\underset{\|}{\overset{}{C}}—CH_3$ (with O below the C)

(d) 

18. Which of the following is true?

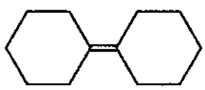
(a) Alcohol give red colour with cerric ammonium nitrate

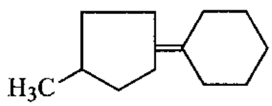
(b) Aldehyde and ketone give orange red colour with 2,4-DNP

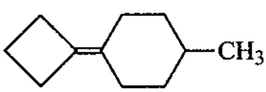
(c) RCOOH give CO_2 with $NaHCO_3$

(d) All are true

19. Compound (A) $C_{12}H_{20}$, discharges the colour of $Br_2—H_2O$ and cold $KMnO_4$. On reduction with H_2/Pt it gives compound (B) $C_{12}H_{22}$. A on ozonolysis give cyclohexanone. Find structure of A :

(a) 

(b) 

(c) 

(d) None of these

20. Which of the following is true?

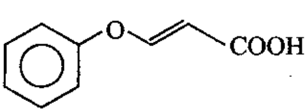
(a) Tollen's reagent gives a positive test with all aldehyde

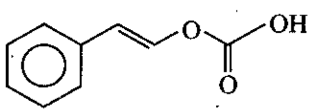
(b) Fehling's solution gives a positive test with all aldehyde

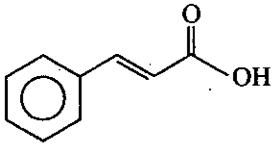
(c) Tollen's reagent gives a positive test with all carboxylic acid

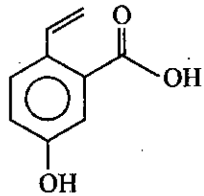
(d) Tollen's reagent gives a positive test with α-methyl keto

21. A monocarboxylic acid decolourise $Br_2—H_2O$, on heating with soda lime derivative of styrene is formed, with neutral $FeCl_3$, a buff coloured precipitate is formed. Acid could be :

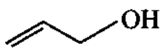
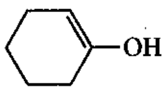
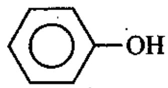
(a) 

(b) 

(c) 

(d) 

22. Which of the following compounds decolourise Br_2—H_2O and also give positive test with neutral $FeCl_3$:

(a)  (b)  (c)  (d) 

23. Lassaigne's test for the detection of N fails in :

(a) $NH_2—\overset{\overset{\large O}{\|}}{C}—NH—NH_2$

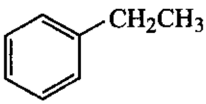
(b) $NH_2—NH_2$

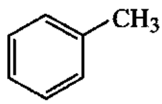
(c) $NH_2—\underset{\underset{\large O}{\|}}{C}—NH_2$

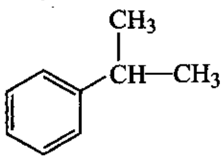
(d) $C_6H_5—NH—NH_2$

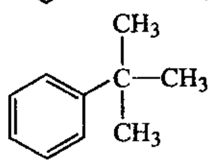
EXERCISE-2 MORE THAN ONE CORRECT ANSWERS

1. Which of the following aromatic compounds will react with $KMnO_4$?

(a) 

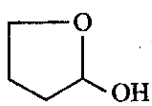
(b) 

(c) 

(d) 

2. Which of the following compounds give positive test with Tollen's reagent?

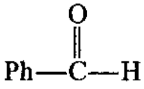
(a) $H—\overset{\overset{\large O}{\|}}{C}—OH$

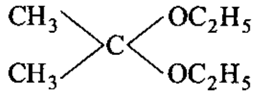
(b) 

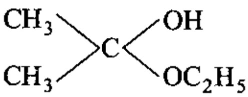
(c) $CH_3—\underset{\underset{\large OH}{|}}{CH}—OC_2H_5$

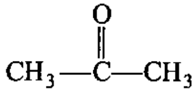
(d) $CH_3—\overset{\overset{\large O}{\|}}{C}—H$

3. Which of the following compounds give negative test with Tollen's reagent?

(a) 

(b) 

(c) 

(d) 

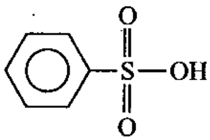
4. Which of the following reagents cannot be used for differentiation between glucose and fructose?

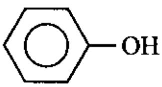
(a) Lucas reagent (b) Br_2—H_2O
(c) Tollen's reagent (d) 2,4-DNP

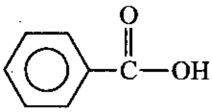
5. Which of the following reagents can be used to differentiate between $Ph-\underset{\underset{O}{\|}}{C}-H$ and CH_3CH_2OH?

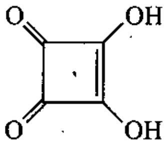
(a) NaOI (b) Fehling's solution
(c) Tollens' reagent (d) $ZnCl_2$/H

6. Which of the following compounds produce CO_2 on reaction with $NaHCO_3$?

(a) 

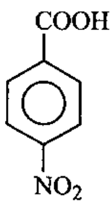
(b) 

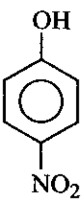
(c) 

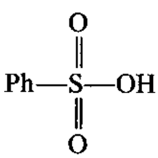
(d) 

7. Which of the following compounds will react with $NaNH_2$?

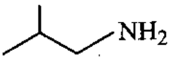
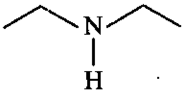
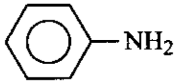
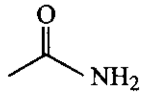
(a) $CH_3-C\equiv CH$

(b) 

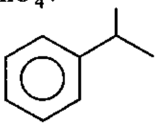
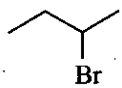
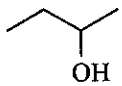
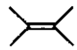
(c) 

(d) 

8. Which of the following compounds will give isocyanide on reaction with $CHCl_3 + KOH$?

(a)  (b)  (c)  (d) 

9. Which of the following compounds may give reaction with acidic $KMnO_4$?

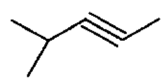
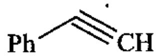
(a)  (b)  (c)  (d) 

10. Which of the following reagents can be used to differentiate 1° and 3° alcohols?
(a) pcc (b) $K_2Cr_2O_7/H^{\oplus}$ (c) Jones reagent (d) $Br_2—H_2O$

11. Which of the following reagents cannot be used for differentiation between CH_3CHO and $CH_3—\underset{\underset{O}{\|}}{C}—Ph$?

(a) NaOI (b) Tollen's reagent
(c) $H_2N—OH$ (d) $Ph—NH—NH_2$

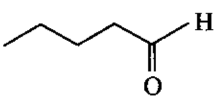
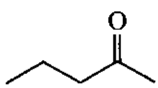
12. Which of the following will not give white precipitate with ammoniacal silver nitrate solution?

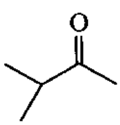
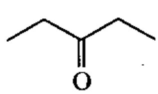
(a) $CH_3—C\equiv C—CH_3$ (b) 
(c)  (d) 

13. Which of the following tests can be used for differentiation among 1°, 2° and 3° alcohol?
(a) Lucas test (b) Victor meyer's test
(c) Cu/300°C (d) Haloform reaction

14. Which of the following test can be used for identification of 1° amine?
(a) Carbylamine test (b) Hofmann mustard oil reaction
(c) $NaNO_2/HCl$ (d) Fehling's solution

15. Unknown compound (*A*) $C_5H_{10}O$ give positive test with 2,4-DNP but negative test with Tollen's reagent. It also give yellow precipitate with $I_2/NaOH$. (*A*) is :

(a)  (b) 

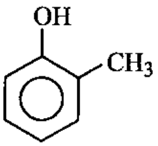
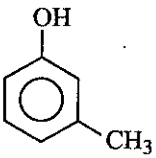
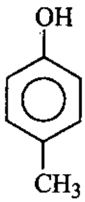
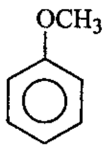
(c)  (d) 

EXERCISE-3 LINKED COMPREHENSION TYPE

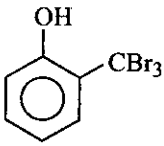
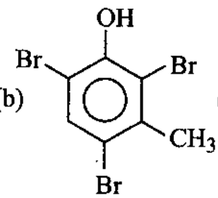
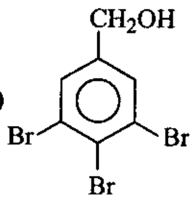
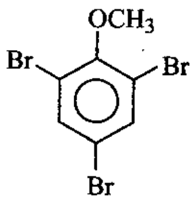
Passage-1

Compound $(A)\,C_7H_8O$ is insoluble in aqueous $NaHCO_3$ and dissolves in aqueous NaOH and gives a characteristic colour with neutral $FeCl_3$. When treated with Br_2 (A) forms compound $(B)\,C_7H_5OBr_3$.

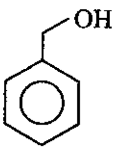
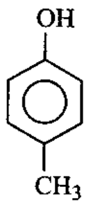
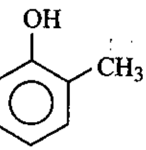
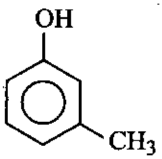
1. The most probable structure of compound A is :

(a)  (b)  (c)  (d) 

2. The structure of compound (B) would be :

(a)  (b)  (c)  (d) 

3. What could be the structure of compound (A) if neither dissolves in aq. $NaHCO_3$ nor gives a characteristic colour with $FeCl_3$?

(a)  (b)  (c)  (d) 

Passage-2

From the following sequence of reactions,

$[A]\,(C_6H_{12}) \xrightarrow{HCl} (B)\,(C_6H_{13}Cl) + (C)\,(C_6H_{13}Cl)$ react with $AgNO_3$ to give white ppt.

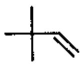
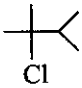
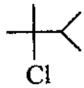
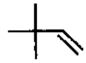
$[B] \xrightarrow{\text{Alc. KOH}} (D)$ (An isomer of A) gives positive test with Br_2/CCl_4

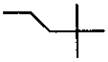
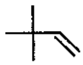
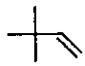
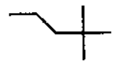
$[D] \xrightarrow{\text{Ozonolysis}} (E)$ gives positive iodoform test and negative Fehling's test.

$$[A] \xrightarrow{\text{Ozonolysis}} (F) + (G)\text{, both } F \text{ and } G \text{ give positive Tollen's test.}$$

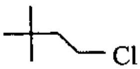
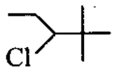
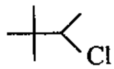
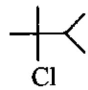
$$[F] + [G] \xrightarrow[\Delta]{\text{Conc. NaOH}} \text{HCOONa} + \text{alcohol}$$

4. The structure A and B respectively are :

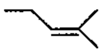
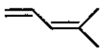
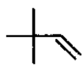
(a)  and  (b)  and 

(c)  and  (d)  and 

5. The structure of C is :

(a)  (b)  (c)  (d) 

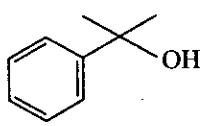
6. The structure of compound D is :

(a)  (b)  (c)  (d) 

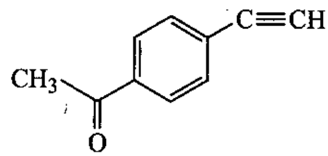
7. The reaction involve in the F and G with the NaOH is :
(a) Reimer-Tiemann reaction (b) Aldol condensation
(c) Cannizzaro reaction (d) Perkin reaction

EXERCISE-4 MATRIX MATCH TYPE

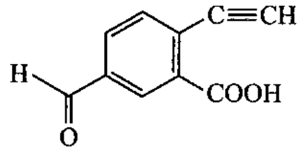
1. | **Column (I)** | **Column (II)** |
|---|---|
| (a) $Ph—\overset{O}{\overset{\|}{C}}—CH_3$ | *P*. Aldol condensation |
| (b) $CH_3—\overset{O}{\overset{\|}{C}}—H$ | *Q*. Positive iodoform test |
| (c) $Ph—\overset{O}{\overset{\|}{C}}—H$ | *R*. Negative test of Fehling's solution |
| (d) CH_3CH_2OH | *S*. Oxidation with Cu/Δ |

2. | **Column (I)** | **Column (II)** |
|---|---|
| (a) $NaHCO_3$ | *P*.  |

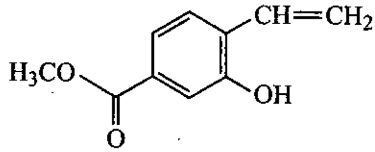
(b) Na metal

Q. 

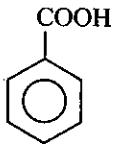
(c) 2,4,-Dinitrophenyl hydrazine

R. 

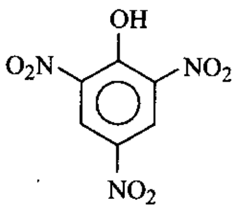
(d) Lucas reagent

S. 

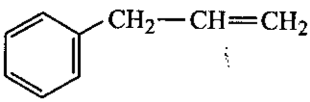
3. Column (I) **Column (II)**

(a) 

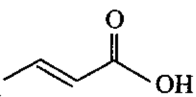
P. Decolourise Br_2 water

(b) 

Q. Effervescence of CO_2 on reaction with $NaHCO_3$

(c) 

R. Oxidation with alkaline $KMnO_4$

(d) 

S. React with Na metal

4. Column (I) **Column (II)**

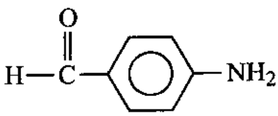
(a) $CH_3—C\equiv CH$

P. Positive test with Fehling's solution

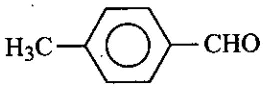
(b) $H—\overset{\overset{\displaystyle O}{\|}}{C}—OH$

Q. Positive test with Tollen's reagent

(c)  R. Decolourise Br_2—H_2O

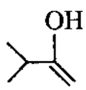
(d)  S. Isocyanide test

5. **Column (I)** | **Column (II)**

(a)  + 2,4-DNP P. Yellow

(b) $Ph-\overset{O}{\overset{\|}{C}}-CH_3 + I_2/\overset{\ominus}{O}H$ Q. Orange

(c)  $NO_2 + HNO_2$ R. Violet

(d)  $+ FeCl_3$ S. Blue

6. **Column (I)** | **Column (II)**

(a) Presence of halogen P. $HNO_3/AgNO_3$

(b) Presence of sulphur Q. $Na_2[Fe(CN)_5NO]$

(c) Presence of nitrogen R. $Co(NO_3)_2$

(d) Presence of N and S S. $FeCl_3$

ANSWERS

Exercise-1 : Only One Correct Answer

1. (c)	2. (d)	3. (a)	4. (c)	5. (b)	6. (a)	7. (c)	8. (a)	9. (d)	10. (c)
11. (c)	12. (a)	13. (c)	14. (a)	15. (b)	16. (d)	17. (b)	18. (d)	19. (a)	20. (a)
21. (d)	22. (c)	23. (b)							

Exercise-2 : More Than One Correct Answers

1. (a, b, c)	2. (a, b, c, d)	3. (b, c, d)	4. (a, c)	5. (a, b)	6. (a, c, d)
7. (a, b, c, d)	8. (a, c)	9. (a, c, d)	10. (a, b, c)	11. (a, c, d)	12. (a, b, c)
13. (a, b, c)	14. (a, b, c)	15. (b, c)			

Exercise-3 : Linked Comprehension Type

1. (b)	2. (b)	3. (a)	4. (a)	5. (c)	6. (d)	7. (c)

Exercise-4 : Matrix Match Type

1. (a) $\rightarrow P, Q, R$;	(b) $\rightarrow P, Q$;	(c) $\rightarrow R$;	(d) $\rightarrow Q, S$
2. (a) $\rightarrow R$;	(b) $\rightarrow P, Q, R, S$;	(c) $\rightarrow Q, R$;	(d) $\rightarrow P$
3. (a) $\rightarrow Q, S$;	(b) $\rightarrow Q$;	(c) $\rightarrow P, R$;	(d) $\rightarrow P, Q, R, S$
4. (a) $\rightarrow Q, R$;	(b) $\rightarrow P, Q$;	(c) $\rightarrow S$;	(d) $\rightarrow Q, S$
5. (a) $\rightarrow Q$;	(b) $\rightarrow P$;	(c) $\rightarrow S$;	(d) $\rightarrow R$
6. (a) $\rightarrow P$;	(b) $\rightarrow Q$;	(c) $\rightarrow S$;	(d) $\rightarrow R$

12 Nomenclature

SECTION-I

Give IUPAC name for each of the following:

1. $N\equiv CCH_2COOH$

2. $CH_3-\overset{\overset{Cl}{|}}{C}H-\overset{\overset{O}{\|}}{C}-CH_3$

3. $CH_3-\underset{\underset{OH}{|}}{C}H-CH_2Cl$

4. $CH_3CH_2-\overset{\overset{Br}{|}}{C}HCOOH$

5. $CH_3-\overset{\overset{OCH_3}{|}}{C}H-CH_2-CHO$

6. $CH_3-CH=CH-CH=CH_2$

7. $CH_3-\overset{\overset{O}{\|}}{C}-CH_2-Br$

8. $CH_2OHCH_2CH_2CH_2OH$

9. $HOCH_2CH_2CH_2COOH$

10. $CH_3\underset{\underset{Br}{|}}{C}HCH_2COOCH_3$

11. $HOOCCH_2\underset{\underset{OH}{|}}{C}HCH_2COOH$

12. $CH\equiv CCH_2CN$

13. $CH_3CH_2CH_2\underset{\underset{ClCH_2-CH_2}{|}}{C}=CH_2$

14. $(CH_3)_2CH\overset{\overset{O}{\|}}{C}CH_2COOCH_3$

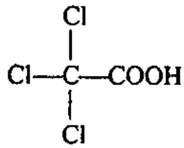
15. $CH_2=CHCH_2CH_2\underset{\underset{O}{\|}}{C}CH_3$

16. $CH_3\underset{\underset{NH_2}{|}}{C}H-CH_2CH_2\underset{\underset{OH}{|}}{C}HCH_2CH_3$

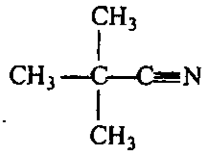
17. $CH_3CH=CHCHO$

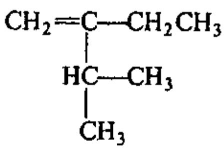
18. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_2CHO}{|}}{C}}-Cl$

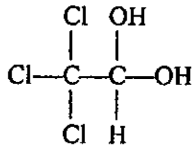
19. $CH_2{=}CHCOOH$

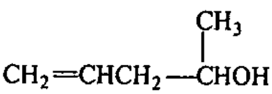
20. 

21. $CH_2{=}CH{-}CH{=}CH{-}CH{=}CH_2$

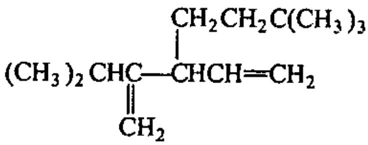
22. 

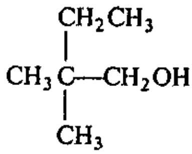
23. 

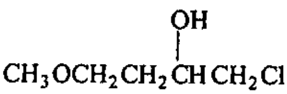
24. 

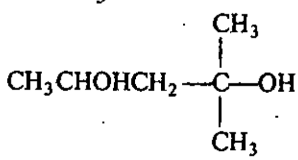
25. 

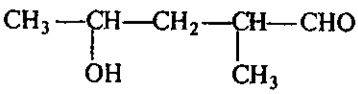
26. $CH_2{=}CH{-}C{\equiv}C{-}CH_2OH$

27. 

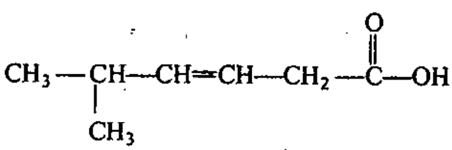
28. 

29. 

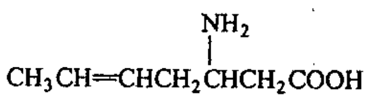
30. 

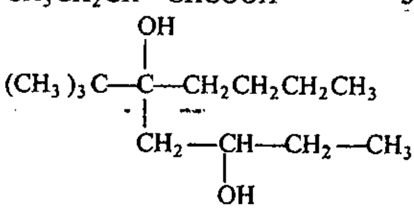
31. 

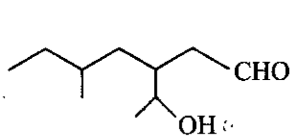
32. $CH_3CH(OH)CH_2CH_2COOH$

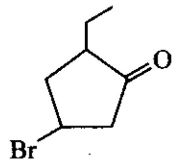
33. 

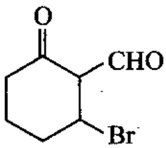
34. $CH_3CH_2CH{=}CHCOOH$

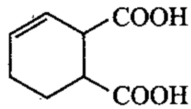
35. 

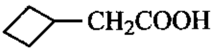
36. 

37. 

38. 

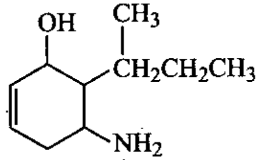
39. 

40. 

41. 

42. $CH_3\underset{CN}{\underset{|}{CH}}CH_2\underset{Cl}{\underset{|}{CH}}-CH_3$

43. $CH_3\underset{Br}{\underset{|}{CH}}-\overset{CH_3}{\overset{|}{\underset{OH}{\underset{|}{C}}}}-\underset{O}{\underset{\|}{C}}-O-CH_3$

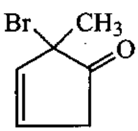
44. 

45. $\begin{array}{l} CH_2COOH \\ | \\ C(OH)COOH \\ | \\ CH_2COOH \end{array}$

46. $CH_2=CH-C\equiv C-\underset{CH_3}{\underset{|}{CH}}COOH$

47. $ClCH_2-\underset{OH}{\underset{|}{CH}}-\underset{OH}{\underset{|}{CH}}-CH_3$

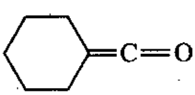
48. $HOOC-CH=CH-COOH$

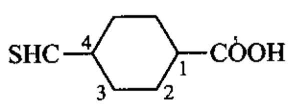
49. 

50. $H_5C_2O\underset{O}{\underset{\|}{C}}-CH_2CH_2\underset{O}{\underset{\|}{C}}-OC_2H_5$

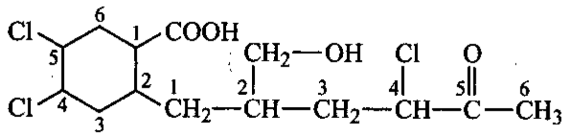
51. $CH_3C=\underset{CH_3}{\underset{|}{CH}}-C=\underset{Cl}{\underset{|}{CH}}-\overset{O}{\overset{\|}{C}}-CH_3$

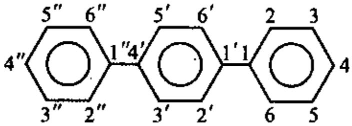
52. $CH_3CH=CHCl$

53. 

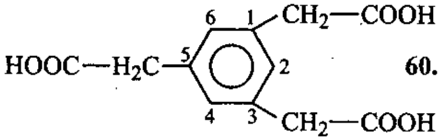
54. 

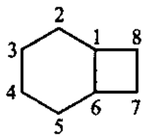
55. 

56. 

57. 

58. $HOOC-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2-O-CH_2-CH_2(COOH)$

59. 

60. 

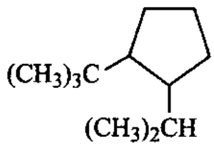
61. $OHC-CH_2-CH_2-C(=O)-OH$

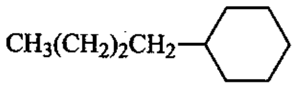
62. $H_3C-C(COOCH_3)=CH-COOH$

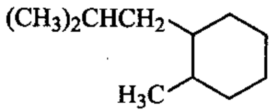
63. $H_3C-C(=O)-CH_2-C(=O)-OH$

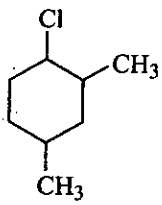
64. $H_3C-C(=O)-CH(OH)-CH(NH_2)-COOH$

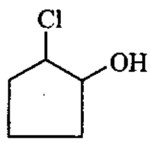
65. $H_2C(Cl)-CH_2-CH(CONHCH_3)-C(=O)-CH=CH_2$

66. 

67. 

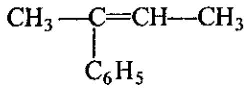
68. 

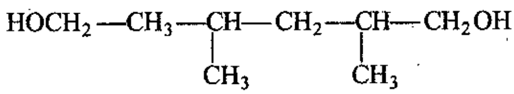
69. 

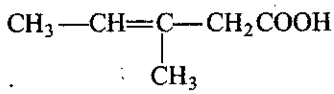
70. 

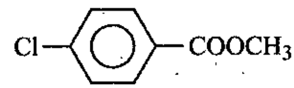
71. $CH_3-CH_2-CH(CH_3)-CH_2COOK$

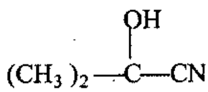
72. $(CH_3)_2CClCHBrCOOH$

73. 

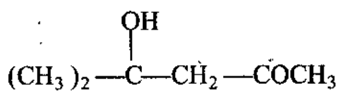
74. 

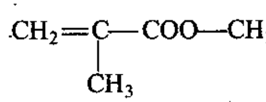
75. 

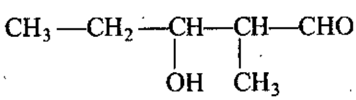
76. 

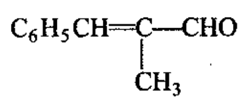
77. 

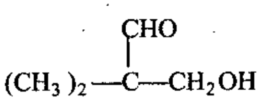
78. $C_6H_5CH{=}C(CH_3)_2$

79. 

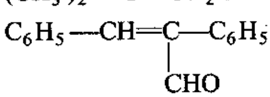
80. 

81. 

82. 

83. 

84. $C_6H_5CH{=}CH{-}CO{-}C_6H_5$

85. 

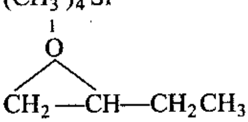
86. $C_6H_5{-}CH{=}CH{-}CO{-}CH_3$

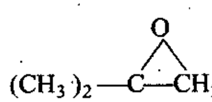
87. $(C_2H_5O)_2Zn$

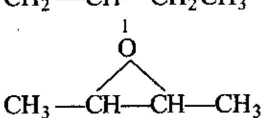
88. $[(CH_3)_3CO]_3Al$

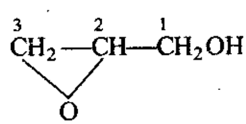
89. $(CH_3)_4Si$

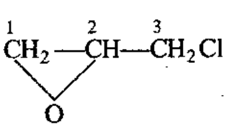
90. $(C_2H_5)_3B$

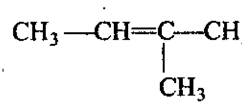
91. 

92. 

93. 

94. 

95. 

96. 

97. $CH_3CH_2-O-CH(CH_3)-CH_3$

98. $CH_2Br-CH_2-C(=O)-CH_2CH_3$

99. $CH_3-CH_2-CH(CH_3)-C(CH_3)_2-CH_2OH$

100. $CH_3-C(=O)-Cl$

101. $CH\equiv C-CH_2-CH_2-CH_2OH$

102. $CH_2OH-CHOH-CH_2OH$

103. $CH_3-C(CH_3)=C(CH_3)-CH_3$

104. $CH_3-C(CH_3)=CH-C(CH_3)_2-CH_3$

105. $CH_3-CO-CO-CH_2CH_3$

106. $CH_3-CH(OH)-CH=CH-COOH$

107. CH_2Cl-CH_2-CHO

108. $CH_3-CH=C=CH-CH_3$

109. $CH_2=CH-C\equiv C-CH=CH-CH_3$

110. $CH_2Cl-CHCl_2$

111. $CH_3-CH(Cl)-COOH$

112. $CH_2=C(Cl)-CH=CH_2$

113. $CH_3-C(CH_3)=CH-CH_2-CH_2OH$

114. $CH_3-C(=O)-NHC_6H_5$

115. $CH_3-C(CH_3)_2-CH_2-C(=O)-NHCH_3$

SECTION-II

Write down structure of the following compounds:

1. 1,2-dibromo-3-chloro-1-propene
2. 2-ethoxy-1-ethanol
3. 2-butenamide
4. 2-aminopropanoic acid
5. 2-chloromethoxyethanol
6. 3-bromo-1-propene
7. 1,3-dichloro-2-propanol
8. 3-buten-2-ol
9. 3-methyl-2-butenoic acid
10. 4-dimethylamino-2-butanol
11. 3-chloro-3-methyl-1-butyne
12. 2-methyl-2-pentenal
13. 2-ethyl-3-hydroxyhexanal
14. 4-methyl-2-pentene
15. 2-methyl-2-butene
16. 3-ethyl-1,3-hexanediol
17. 4-methoxy-2-butenoic acid
18. 1,5-hexadiene
19. 2-propen-1-ol
20. 2,2,2-trichloroethanoic acid

21. 2-chloro-1,3-butadiene
22. 2-methyl-2-propene-1,1-dicarboxylic acid
23. 2-methyl-2-butenoic acid
24. 3-bromo-2-methylpentan-2-ol
25. 3-methylbut-3-en-1-ol
26. pentane-2,4-dione
27. 1-ethoxypropan-1-ol
28. 6-hydroxy-3,5-dimethyloct-4-enal
29. 5-bromopent-3-en-2-one
30. 4-cyano-4-ethylpentan-3-one
31. 2-chlorohex-5-ynal
32. 2-methylbutane
33. 2,2,4-trimethylpentane
34. 3-methylpentane
35. 4-ethylheptane
36. 5-ethyl-2,2-dimethylheptane
37. 3-methylpentane
38. 4-*tert*-butyl-2-methylheptane or 4-(1,1-dimethylethyl)-2-methylheptane
39. 4-ethyl-3-methylheptane
40. 4-isopropylheptane or 4-(1-methylethyl) heptane
41. 2,3-dimethylpentane
42. 2-ethyl-1-hexene
43. 2-methylpropene
44. 2-ethyl-3-methyl-1-butene
45. 2-methylpropane
46. 2,2,4-trimethylpentane
47. 3,3,5-trimethylheptane
48. 3,3-dimethyl-1-butene
49. 2,4-dimethyl-2-pentene
50. 2-methyl-3-hexyne
51. 1,2,3-trichlorobutane
52. 1,2-dibromo-3-chlorobutane
53. 1-bromo-2,2-dimethylpropane
54. 2-methyl-2-propanol
55. 1-phenyl-2-propanol
56. 1-phenyl-1-propanol
57. 3-ethyl-3,7,7-trimethyl-2-octanol
58. 2-phenylethanol
59. Propanal
60. 3-cyclopropyl-3-methylbutanal
61. 3-methyl-2-butanone
62. 3-methylbutanal
63. 3-methylbutanoic acid
64. 4-methyl-2-pentanone
65. Ethyl propanoate
66. *N,N*-diethylpropanamide
67. 3-methoxypentane
68. 1-ethoxypropane
69. 3-methylpentanoic acid
70. Propanoic anhydride
71. *N*-ethylethanamide
72. Isopropyl propanoate or 1-methylethyl propanoate
73. *N*-methylpropanamide
74. 2-methyl-3-phenylpentanoic acid
75. 3-chloro-1-butanol
76. 4-chloro-2-pentyne
77. 3-(1-chloroethyl)-4-methyl-4-phenyl-2-pentanone
78. 3-chloro-4-methyl-3-hexene
79. 3-bromo-1-propyne
80. 2-ethyl-3-oxobutanal
81. 2-butenoic acid
82. 2-oxobutanoic acid
83. Methylaminoethanoic acid
84. Bromopropanone
85. 1-chloro-2-propanol
86. 1,2-dimethoxyethane
87. 4-methoxy-2-methyl-2-butanol
88. 3-penten-1-ol
89. 4-methyl-3-penten-2-one
90. 3,5-hexadienoic acid
91. 1,1-dichloro-2-methylpropene
92. 2-hydroxybutanoic acid
93. 1-chloro-5-methyl-2-hexanone
94. 3-bromo-1,3,5-hexatriene
95. 3,3-dimethyl-1-penten-4-yne
96. 1-bromo-3-methoxypropane
97. 1,4-dibromo-1-butyne
98. Methoxypropanone
99. 3-bromo-*N*-ethylbutanamide
100. 3-methoxy-2-pentanol
101. 4-chloro-2-ethyl-1-butene
102. 1-penten-3-one
103. 4-methyl-3-pentenal
104. 5-amino-3-methylhexanoic acid
105. 5-bromo-3-hexanol
106. Propenenitrile
107. Butenedioic acid
108. 2-butyne-1,4-diol
109. 2-methylpropanedioic acid

110. 1-ethyl-1-methylcyclohexane
111. 1-isopropyl-3-methylcyclohexane
112. 1-cyclobutyl-3-methylpentane
113. Methyl 3-bromo-2-hydroxy-2-methylbutanoate
114. 5-oxopentanoic acid
115. *N*, 3,3-trimethyl-1-butanamine
116. 4-chloro-2-methylpentanenitrile

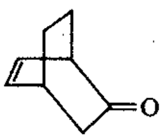
SECTION-III

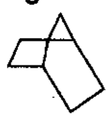
Write down the bond line structure of the following:

1. Bicyclo [3. 1. 0] hexane
2. 8-chlorobicyclo [4. 2.0] oct-2-ene
3. 4-bromo-9-methyltricyclo [5.3.0.$0^{2,6}$] decane
4. Cyclododecane
5. Ethyl butanoate
6. 1-pentane nitrile or 1-pentanonitrile
7. 2-methoxy-2-methyl-propane
8. Propanalimine
9. *N,N*-dimethyl-ethanamide
10. 3-methyl-2-butanol
11. *N*-ethyl-*N*-methyl-2-aminopropane
12. 2,4-hex-di-yne
13. 2-heptyne
14. 1-hexyne
15. 3-methyl-1-pentene
16. 3-methyl-1-cyclohexene
17. *Cis*-(or Z-) 3-hexene
18. *Cis*- (or Z-) 2-butene
19. *Trans*- (or E-) 2-butene
20. 2-methyl-2-cyclopropylpropane
21. 4-*tert*-butyl heptane
22. *Trans*-1,2-dimethylcyclohexane
23. *Trans*-1,3-dimethylcyclobutane
24. *Cis*-1,2-dimethylcyclobutane
25. *Cis*-1-methyl-3-isopropylcyclohexane
26. 5-ethyl-3-methyl-4-isopropyl nonane
27. 2,2-dimethylbutane
28. 2-cyclohexylbutane
29. *n*-pentane

SECTION-IV

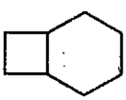
Write down the IUPAC name of the following :

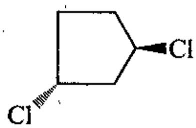
1. 

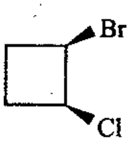
2. 

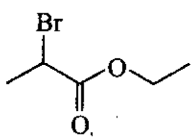
3. 

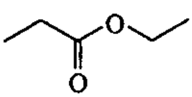
4. 

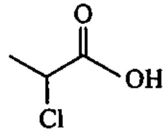
5. 

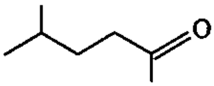
6. 

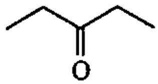
7. 

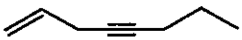
8. 

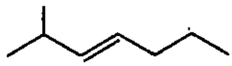
9. 

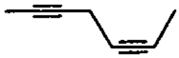
10. 

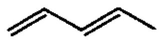
11. 

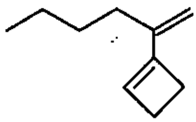
12. 

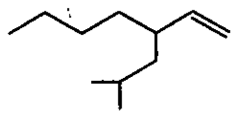
13. 

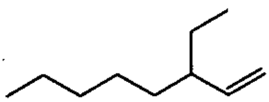
14. 

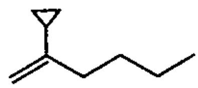
15. 

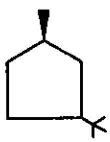
16. 

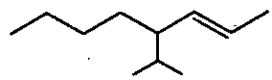
17. 

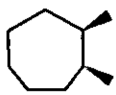
18. 

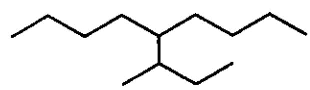
19. 

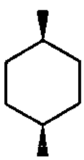
20. 

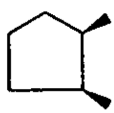
21. 

22. 

23. 

24. 

25. 

26. 

HINTS AND SOLUTIONS

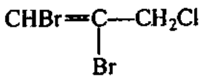
Section-I

1. 2-cyanoethanoic acid
2. 3-chloro-2-butanone
3. 1-chloro-2-propanol
4. 2-bromobutanoic acid
5. 3-methoxybutanal
6. 1,3-pentadiene
7. Bromopropanone
8. 1,4-butanediol
9. 4-hydroxybutanoic acid
10. Methyl, 3-bromobutanoate
11. 3-hydroxypentanedioic acid
12. 3-butynenitrile
13. 2-(2-chloroethyl)-1-pentene
14. Methyl, 4-methyl-3-oxopentanoate
15. 5-hexen-2-one
16. 6-amino-3-heptanol

2-butenal
Propenoic acid
1,3,5-hexatriene
2-ethyl-3-methyl-1-butene
4-penten-2-ol
3-chloro-3-methylbutanal
2,2,2-trichloroethanoic acid
2,2-dimethylpropanenitrile
2,2,2-trichloro-1,1-ethanediol
4-penten-2-yn-1-ol
2-isopropyl-3-(3,3-dimethylbutyl)-1,4-pentadiene
2,2-dimethyl-1-butanol
2-methyl-2,4-pentanediol
4-hydroxypentanoic acid
2-pentenoic acid
5-*tert*-butyl-3,5-nonanediol
4-bromo-2-ethylcyclopentanone
3-cyclohexene-1,2-dicarboxylic acid
1-chloro-4-methoxy-2-butanol
4-hydroxy-2-methylpentanal
5-methyl-3-hexenoic acid
3-amino-5-heptenoic acid
3-(1-hydroxyethyl)-5-methylheptanal
6-bromo-2-oxocyclohexanecarbaldehyde
Cyclobutylethanoic acid
4-chloro-2-methylpentanenitrile
Methyl, 3-bromo-2-hydroxy-2-methylbutanoate
3-amino-2-*sec*-butyl-5-cyclohexen-1-ol
3-carboxy-3-hydroxypentanedicarboxylic acid
2-methyl-5-hexen-3-ynoic acid
Butenedioic acid
Diethylbutanedioate
1-chloro-1-propene
4-(thioformyl) benzoic acid
1-chloro-2,3-butanediol
2-bromo-2-methyl-3-cyclopentenone
4-chloro-6-methyl-3,5-heptadien-2-one
Cyclohexylidenemethanone
Cyclohexylarsane
4,5-dichloro-2-[4-chloro-2-hydroxymethyl-5-oxohexyl] cyclohexane-1-carboxylic acid
1,1' : 4', 1" Terphenyl
3, 3'-[oxy *bis* (ethyleneoxy)]dipropanoic acid
Benzene-1,3,5-triacetic acid
Bicyclo [4.2.0] octane
4-oxobutanoic acid or 3-formylpropanoic acid
3-methoxycarbonyl but-2-en-1-oic acid
3-oxobutanoic acid
2-amino-3-hydroxy-4-oxopentanoic acid
N-methyl-2-(2'-chloroethyl)-3-oxo-pent-4-en-1-amide
1-(1-methylethyl)-2-(1,1-dimethylethyl) cyclopentane or
1-*tert*-butyl-2-isopropylcyclopentane
1-methyl-2-(2-methylpropyl) cyclohexane or 1-isobutyl-2-methylcyclohexane
Butylcyclohexane
2-chlorocyclopentanol
2-bromo-3-chloro-3-methylbutanoic acid
2,4-dimethyl-1,6-hexanediol
Methyl-*p*-chloro benzoate
2-methyl-1-phenyl-1-propene
Methyl-2-methyl-2-propenoate
2-methyl-3-phenyl-2-propenal
1,3-diphenyl-2-propen-1-one
4-phenyl-3-buten-2-one
Al-*tert* butoxide
Triethyl borane
2,2-dimethyl oxirane
2,3-epoxy-1-propanol
2-methyl-2-butene
1-bromo-3-pentanone
Ethanoyl chloride
1,2,3-propanetriol
1-chloro-2,4-dimethylcyclohexane
Pot.-3-methyl pentanoate
2-phenyl-2-butene
3-methyl-3-pentenoic acid
2-hydroxy-2-methyl-2-propane nitrile
4-hydroxy-4-methyl-2-pentanone
3-hydroxy-2-methyl pentanal
3-hydroxy-2,2-dimethyl propenal
2,3-diphenyl-2-propenal
Zinc ethoxide
Tetramethyl silane
2-ethyl oxirane or 1,2-epoxybutane
2,3-dimethyl oxirane
1,2-epoxy-1-propanol
Ethyl isopropyl ether
2,2,3-trimethyl-1-pentanol
4-pentyn-1-ol
2,3-dimethyl-2-butene

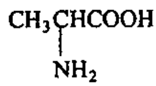
104. 2,4,4-trimethyl-2-pentene
105. 2,3-pentanedione
106. 4-hydroxy-2-pentenoic acid
107. 3-chloropropanal
108. 2,3-pentadiene
109. 1,5-heptadien-3-yne
110. 1,1,2-trichloroethane
111. 2-chloropropanoic acid
112. 2-chloro-1,3-butadiene
113. 4-methyl-3-penten-1-ol
114. *N*-phenylethanamide
115. *N*,3,3-trimethylbutanamide

Section-II

1. 

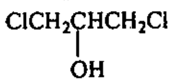
2. $C_2H_5OCH_2CH_2OH$

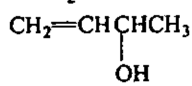
3. $CH_3CH{=}CHCONH_2$

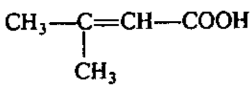
4. 

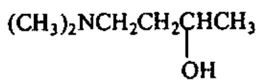
5. $ClCH_2OCH_2CH_2OH$

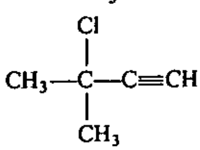
6. $BrCH_2{-}CH{=}CH_2$

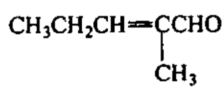
7. 

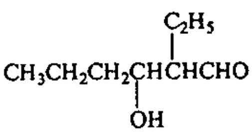
8. 

9. 

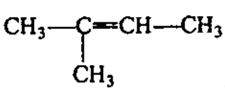
10. 

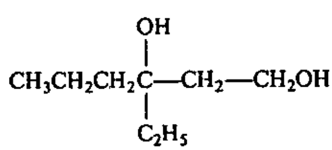
11. 

12. 

13. 

14. $(CH_3)_2CH{-}CH{=}CH{-}CH_3$

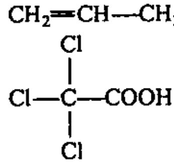
15. 

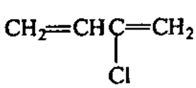
16. 

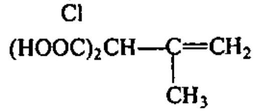
17. $CH_3OCH_2CH{=}CHCOOH$

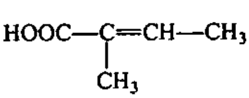
18. $CH_2{=}CH{-}CH_2{-}CH_2{-}CH{=}CH_2$

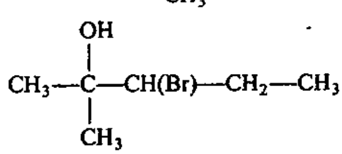
19. $CH_2{=}CH{-}CH_2OH$

20. 

21. 

22. 

23. 

24. 

$HOCH_2CH_2C(CH_3){=}CH_2$

$CH_3{-}CO{-}CH_2{-}CO{-}CH_3$

$CH_3{-}CH_2O{-}CH(OH){-}CH_2{-}CH_3$

$OHC{-}CH_2{-}CH(CH_3){-}CH{=}C(CH_3){-}CH(OH){-}CH_2CH_3$

$CH_3COCH{=}CH{-}CH_2Br$

$CH_3CH_2COC(CN)(C_2H_5){-}CH_2{-}CH_2CH_3$

$OHC{-}HC(Cl){-}(CH_2)_2C{\equiv}CH$

$CH_3CH_2CH(CH_3)_2$

$(CH_3)_3CCH_2CH(CH_3)_2$

$CH_3CH(CH_2CH_3)_2$

$CH_3CH_2CH_2CH(CH_2CH_2CH_3)CH_2CH_3$

$CH_3{-}C(CH_3)_2CH_2CH_2CH(CH_2CH_3)CH_2CH_3$

$CH_3CH_2CH(CH_2CH_3)CH_3$

$(CH_3)_3C{-}CH(CH_2CH_2CH_3)CH_2CH(CH_3)CH_3$

$CH_3CH_2CH_2CH(H_3CCHCH_2CH_3)CH_2CH_3$

$CH_3CH_2CH_2CH(H_3CCHCH_3)CH_2CH_2CH_3$

$CH_3CH(CH_3)CH(C_2H_5)CH_3$

$CH_3CH_2CH_2CH_2C({=}CH_2)CH_2CH_3$

$CH_3{-}C(CH_3){=}CH_2$

$CH_2{=}C(CH(CH_3)CH_3){-}CH_2CH_3$

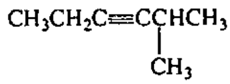
$CH_3{-}CH(CH_3){-}CH_3$

$CH_3CH(CH_3)CH_2{-}C(CH_3)_2{-}CH_3$

$CH_3{-}CH(C_2H_5){-}CH_2{-}C(CH_3)_2{-}CH_2CH_3$

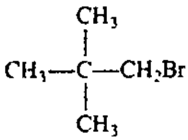
$CH_3{-}C(CH_3)_2{-}CH{=}CH_2$

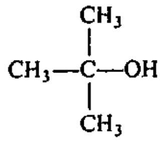
$(CH_3)_2C{=}CHCH(CH_3)_2$

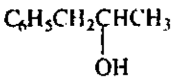


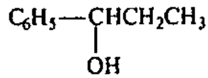
$CH_2Cl{-}CHCl{-}CHCl{-}CH_3$

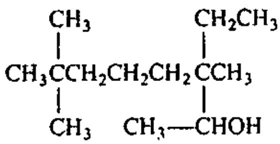
$CH_2Br{-}CHBr{-}CHCl{-}CH_3$





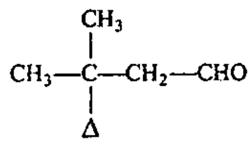


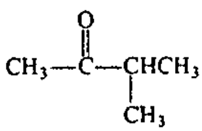


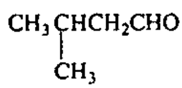


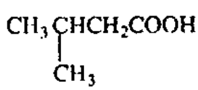
$C_6H_5CH_2CH_2OH$

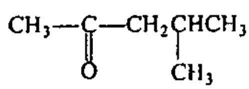
CH_3CH_2CHO

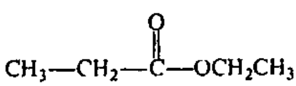


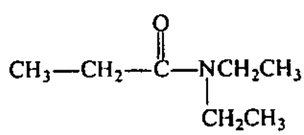


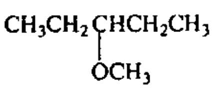








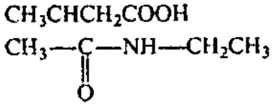


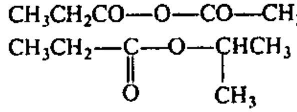


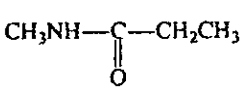
$CH_3CH_2CH_2OCH_2CH_3$

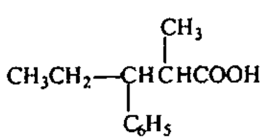
CH_3CHCH_2COOH

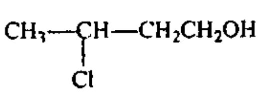
$CH_3CH_2CO{-}O{-}CO{-}CH_2CH_3$

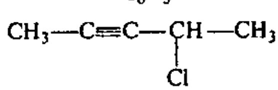


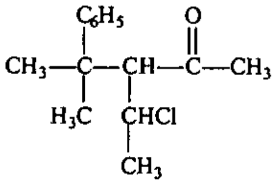


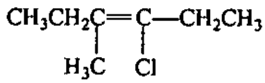




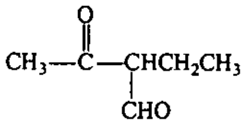




77. 

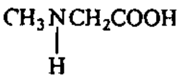
78. 

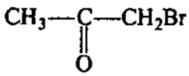
79. $CH\equiv C—CH_2Br$

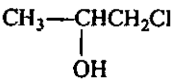
80. 

81. $CH_3CH=CHCOOH$

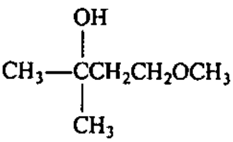
82. CH_3COCH_2COOH

83. 

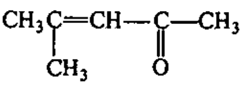
84. 

85. 

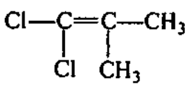
86. $CH_3OCH_2CH_2OCH_3$

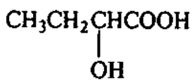
87. 

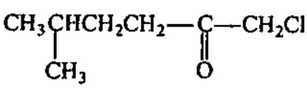
88. $CH_3—CH=CHCH_2CH_2OH$

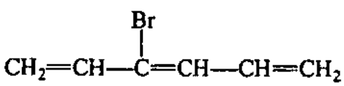
89. 

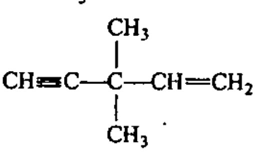
90. $CH_2=CHCH=CHCH_2COOH$

91. 

92. 

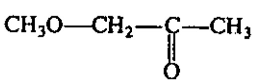
93. 

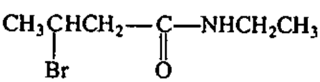
94. 

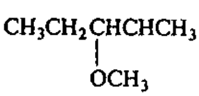
95. 

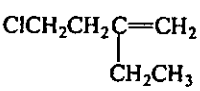
96. $CH_3OCH_2CH_2CH_2Br$

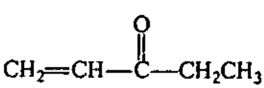
97. $BrC\equiv C—CH_2CH_2Br$

98. 

99. 

100. 

101. 

102. 

103. $CH_3—\underset{\displaystyle CH_3}{\underset{|}{C}}=CHCH_2CHO$

104. $CH_3—\underset{\displaystyle NH_2}{\underset{|}{C}}HCH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2COOH$

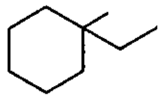
105. $CH_3CH_2\underset{\displaystyle OH}{\underset{|}{C}}HCH_2\underset{\displaystyle Br}{\underset{|}{C}}HCH_3$

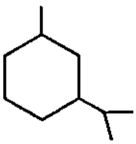
106. $CH_2=CH—C\equiv N$

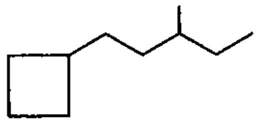
107. $COOH—CH=CH—COOH$

108. $HO—CH_2C\equiv C—CH_2OH$

109. $CH_3\underset{\displaystyle COOH}{\underset{|}{C}}HCOOH$

110. 

111. 

112. 

113. $CH_3\underset{\displaystyle Br}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}H—\underset{\displaystyle OH}{\underset{|}{C}}—\underset{\displaystyle O}{\underset{\|}{C}}—OCH_3$

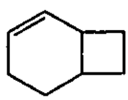
114. $OCH(CH_2)_3COOH$

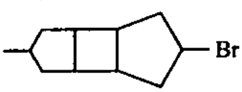
115. $(CH_3)_3CCH_2CH_2NHCH_3$

116. $CH_3\underset{\displaystyle CN}{\underset{|}{C}}HCH_2\underset{\displaystyle Cl}{\underset{|}{C}}HCH_3$

Section-III

1. 

2. 

3. 

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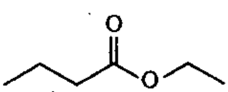
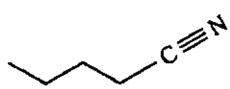
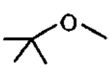
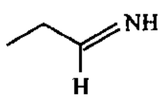
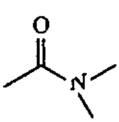
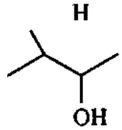
5. 

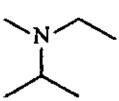
6. 

7. 

8. 

9. 

10. 

11. 

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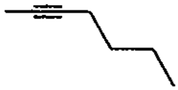
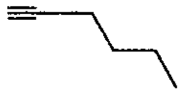
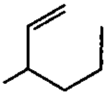
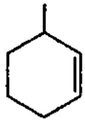
13. 

14. 

15. 

16. 

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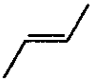
19. 

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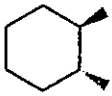
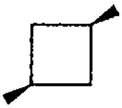
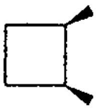
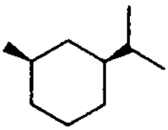
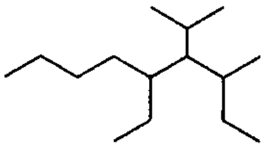
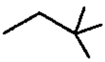
22. 

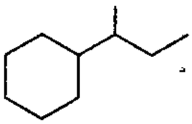
23. 

24. 

25. 

26. 

27. 

28. 

29. 

Section-IV

1. Bicyclo [2.2.2] oct-5-en-2-one
2. Bicyclo [2.2.1] heptane
3. Bicyclo [3.2.1.] octane
4. Spiro [5, 4] decane
5. Bicyclo [4, 2, 0] octane
6. *Trans*-1,3-dichlorocyclopentane
7. *Cis*-1-bromo-2-chlorocyclobutane
8. Ethyl-2-bromopropanoate
9. Methyl propanoate
10. 2-chloropropanoic acid
11. 4-methylpentanal
12. 3-pentanone
13. Octa-1-ene-4-yne
14. 2-methyl-3-hexyne
15. 1,5-octadiyne
16. 1,3-pentadiene
17. 2-(1-cyclobutenyl)-1-hexene
18. 2-isobutyl-1-heptene
19. 3-ethyl-1-octene
20. 2-cyclopropyl-1-hexene
21. *Cis*-1-*t*-butyl-3-methylcyclopentane
22. 4-isopropyl-2-octene
23. *Trans*-1,2-diethylcycloheptane
24. 5-*s*-butylnonane
25. *Trans*-1,4-dimethyl cyclohexane
26. *Cis*-1,2-dimethylcyclopentane

NOTES